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ABSTRACT

This guide was developed to provide assistance in developing and implementing school-to-work programs for the plastics industry throughout the state of Michigan. It is a resource for plastics companies, school districts, community colleges, business development organizations, local governments, work force development boards, or any group interested in starting a partnership for plastics school-to-work programs. The guide contains project summaries and documents on a wide range of topics, organized into six sections: (1) background on the Michigan Jobs Commission and the Michigan Plastics Industry Roundtable; (2) national school-to-work resources, including trade associations and websites; (3) Michigan school-to-work resources, including Michigan business resources, school-to-work in Michigan, plastics school-to-work programs in Michigan, and the Michigan Occupational Information System and the Michigan Center for Career and Technical Education; (4) promoting and recruiting for the program; (5) integrated curriculum, including manufacturing skills, plastics skills, and employability skills; and (6) plastics school-to-work components and tools, such as class activities, visitors and tours, job shadowing, student portfolios, student internships, apprenticeships, and evaluation. (KC)

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Careers in Plastics

A Guide to Establishing a School-to-Work Program in Michigan

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developed through a Grant from
the Michigan Jobs Commission to the
Michigan Plastics Industry Roundtable

by

Richard W. Zinser, Ed.D.

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Careers in Plastics

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A Guide to Establishing a School-to-Work Program in Michigan

developed through a Grant from
the Michigan Jobs Commission to the
Michigan Plastics Industry Roundtable

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Richard W. Zinser, Ed.D.

Acknowledgments

This How-to Guide is the result of work by many people over the course of a one-year project funded by a grant from the Michigan Jobs Commission. The Guide contains documents from numerous sources which are acknowledged wherever possible. My role was to articulate the vision of the Plastics Roundtable, to seek and evaluate resources for the Guide, to organize and present the documents so they can be used by plastics businesses for the support of local school-to-work programs.

I would like to specifically acknowledge the support of Dan Canavan, President, and Edie Smith, former Human Resource Manager, of Triple S Plastics in Vicksburg. I would also like to thank Jim Rudnick and Irv Cumming of Kalamazoo Public Schools, Frank Gregory of Kalamazoo Valley Community College, and Larry Bruno of the Ford Academy of Manufacturing Sciences.

The officers of the Michigan Plastics Industry Roundtable have been a delight to work with. I appreciate their professionalism, hard work, and humor:

Larry Eisenga, Blue Water Plastics
Diane Timmer, Bissell
John Davis, DuPont
Mike Clancy, Libralter Plastics
Art Goodsel, Huron Plastics Group

The staff of the Michigan Jobs Commission are commended for their responsiveness and high-quality services, especially Bill Castanier, Sharon Woollard, Paul Howland, and Kristina Dulles.

There are countless individuals at the ever-growing list of Roundtable companies that have contributed to this work in valuable ways. Similarly, community colleges and universities across the state have provided assistance, especially Gene Whitmore of Ferris State. The Midwest office of the Society of the Plastics Industry, the Michigan Chapter of SPI, and the Western Michigan section of the Society of Plastics Engineers have also been very helpful.

Rick Zinser
Portage, MI

Preface

About the Michigan Plastics Industry Roundtable:

In 1995, the Michigan Jobs Commission recognized the plastics industry as a high growth business sector and invited plastics companies to a meeting in Lansing to discuss issues for which the State might provide assistance. The plastics representatives quickly reached consensus that the number one issue facing the industry was, and is, **workforce development**. Faced with a growth rate of 20% per year, the industry needs to increase the number and skill level of employees at plastics businesses.

Much discussion was generated over the next few months among the industry, education, and government sectors. It was decided to formally organize the Roundtable with a Constitution, a Mission Statement, and an Executive Director. A proposal was developed and submitted for a $75,000 School-to-Work grant which was awarded in January, 1996. The one-year project was launched to assess the industry and education resources throughout the state for workforce development, and to create the Careers in Plastics Guide.

Purpose of the Guide:

Careers in Plastics: A Guide to Establishing a School-to-Work Program in Michigan was developed for the purpose of implementing school-to-work programs for plastics throughout the state. The target population is all students in grades 11-14. It is a resource for plastics companies, school districts, community colleges, business development organizations, local governments, workforce development boards, or any group interested in starting a partnership for plastics school-to-work.

The Guide contains project summaries and documents on a wide range of topics which are organized into sections outlined in the Table of Contents. Introductory and interpretive comments are added to the material wherever appropriate. We believe that using the Guide will provide substantial support to start a local program utilizing some of the best elements of the five existing programs in the counties of Kalamazoo, Kent, Van Buren, St. Clair, and Oakland.

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Introduction

So how does a plastics company start a local school-to-work program? Let's begin with taking a fly-by tour of Careers in Plastics: A Guide to Establishing a School-to-Work Program in Michigan.

Read up on national school-to-work programs and resources to put it in perspective. There are two Cabinet level departments that are supporting this effort. Surf the Internet to see the work that has already been done around the country. Be prepared to participate in the challenge of dispelling myths about school-to-work. Think this is an education program? Think again when you see the national business resources already in place and the three plastics trade associations driven by business. Did you know that there are 35 trade publications related to plastics? To find out what skills are needed in plastics manufacturing the section on skill standards will describe advanced manufacturing, plastics molder, and plastics technologist skills.

The business development arms of the Michigan Jobs Commission and the Plastics Roundtable are implementing supportive structures. They have surveyed the plastics industry throughout the state and have tapped into the existing school-to-work system and resources from Lansing and Michigan State University. The Roundtable has also surveyed and assessed plastics education and training throughout the state. Did you know there are already five plastics school-to-work programs operating and placing students in plastics companies? It is working, but we need to multiply the number of graduates by about a thousand.

There are some proven ways to reach out to your community and other plastics companies to help get a program started. In fact SPI has published 99 ways to get involved! For promotion and recruiting there are numerous posters, pamphlets, and videos available. Important for parents and counselors is our plastics industry career ladder. Meet with students directly and perform some plastics magic; work with teachers in the plant and show them what math and science really look like.

What about course content? You will discover that a lot of material already exists for manufacturing, plastics, and employability skills. For example, Ford has a manufacturing curriculum (FAMS) that is being used in 65 high schools. Plastics companies are also teaming up with community colleges and training experts to provide state-of-the-art education materials. Even the classroom portion of the school-to-work class utilizes the latest teaching techniques and activities (no more lecture-homework-quiz routine).

What about the work part of the formula? Students learn by applying classroom material to the work environment. First, read about the extensive use of guest speakers/teachers from plastics companies to elaborate on learning issues and tours of plastics facilities to demonstrate concepts learned in class. Students participate in job shadowing experiences which provides some one-on-one time with a working adult. Companies provide summer internships for students real working and learning experiences. This could be extended to co-op work during the school year and lead to a formal apprenticeship.

Of course the result of this process is "work-ready" young people with the skills needed by plastics companies. Ultimately this will save companies money in hiring, training, and turnover costs; it will improve employee performance and opportunity for advancement; it will increase company quality, productivity, and service; it will contribute to company profits and growth; and it will improve the economic base and citizenship of the local community.

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Section I Background

Michigan Jobs Commission and Michigan Plastics Industry Roundtable

- The Michigan Jobs Commission (MJC) is the economic development umbrella for the state. The web site for MJC is **http://www.mjc.state.mi.us**. An overview of MJC includes the Mission, Goals and Jobs Agenda.
- MJC created Business Roundtables in 1995 as a customer service initiative for key industry sectors in the state. The **Plastics Roundtable,** one of the most active groups, proposed developing the School-to-Work Industry Model for which this Guide is a direct result.
- With the awarding of the grant in January 1996 the Plastics Roundtable was formalized with a Mission Statement and Constitution. With the completion of the **Guide** in January, 1997 the Roundtable will continue meeting indefinitely to fulfill its mission.

Mission Statement

Judge Us By The Companies We Keep

The Michigan Jobs Commission works in partnership with local communities and existing Michigan businesses to retain and expand job opportunities, prepare Michigan workers for job opportunities and improve Michigan's overall business climate.

Core Values

- Focus on the needs of the customer first.
- Deliver services seamlessly rather than programmatically.
- Build local partnerships that coordinate and leverage resources.

Core Objectives

- Work with existing Michigan businesses to retain and expand jobs.
- Prepare Michigan's workers for employment opportunities.
- Continue to improve Michigan's overall business climate.

Service Guarantee

- Every telephone call will be returned within 24 business hours;
- Routine information requests will be processed within one week;
- Business development needs will be evaluated within 24 business hours and referred to the appropriate account management team;
- Business development needs will be evaluated on-site (where appropriate) within 5 days; and
- Commitments and deadlines of the custom-tailored service strategy will be put in writing.

Customer Assistance Number

- (517) 373-9808

Return To: What is MJC?

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What is Michigan Jobs Commission?

The Michigan Jobs Commission

Michigan's economic development department

On February 28, 1995, the Michigan Jobs Commission became the only department of state government in the country charged with business retention, economic and workforce development.

As a department we are continuing to support important business initiatives and offer a full range of services to help businesses grow and prosper. Most importantly, we will continue to rely on those who know Michigan's business climate best...Michigan job providers.

These are exciting days in Michigan, our economy is stronger than it has been in decades, and we have the responsibility to put this state in an outstanding economic position as we head into the next century.

We are looking forward to working with you to accomplish our 1996 Jobs Agenda. Together, we can create even more good jobs for Michigan.

- MJC Mission Statement
- MJC Goals
- Jobs Agenda
- Business Retention and Expansion Services
- 1995 Annual Report

| MJC | Business | News | Profile | Links

Home | Search | Table of Contents | What's New | Feedback

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Jobs Agenda

Priority One:

Retain and expand Michigan job opportunities

Retaining and expanding existing Michigan businesses has been and will continue to be the state's number one job creation strategy. However, as Michigan has become more competitive, business attraction efforts will become more aggressive.

- **Expand the Michigan Business Retention Program to visit every Michigan job provider with over 100 employees by conducting 3,000 visits in 1996.**

  In addition to promoting small business development across Michigan, the Jobs Commission will continue with its top priority: business retention. Called the "best business retention program in the nation" by America's largest site location consulting firm, the Jobs Commission will visit every employer with 100 or more employees annually to resolve state issues and provide customized services to promote job growth.

- **Launch a national and international business attraction sales program for targeted industries.**

  500 sales calls will be made to the top automotive suppliers, plastics materials companies, plastics producers, engineering firms, multi-media firms, furniture manufacturers and wood producers. Primary target markets will be the midwest and northeast regions of the U.S., Germany, Canada and Japan.

- **Launch the "Michigan: Driving America's Renaissance" marketing initiative.**

  New marketing materials that sell Michigan's unique business advantages and present detailed cost comparisons with other states will be developed to compliment the state's business attraction efforts.

- **Increase private venture capital funds in Michigan.**

  While Michigan ranks 3rd nationally in research and development funding, the state ranks 33rd nationally in the amount of venture capital available to help commercialize product development. A private sector financed and managed fund will be established to implement recommendations of the Governor's Venture Capital Task Force.

- **Create the Michigan Renaissance Fund.**

  Using proceeds from the Michigan Strategic Fund, the Renaissance Fund would provide eligible projects anywhere in Michigan with resources for public infrastructure that supports private sector job creation.

Priority Two:

Prepare Michigan workers for job opportunities

Finding workers with the right skills at the right time continues to be a top priority for job providers.

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Continued emphasis will be placed on upgrading the skills of the Michigan workforce and matching available workers with job providers.

- **Develop a network of 10 trade academies by 1998, with the opening of five new academies this year.**

  These new schools focus on the specific skills needed by key Michigan industry sectors and are operated in close partnership with private industry. The Jobs Commission supports their creation with start-up planning grants and intensive technical assistance.

- **Develop and advocate passage of a youth registered apprenticeship tax credit for job providers and recruit at least 500 high school students to participate in apprenticeships.**

  This SBT tax credit will help fill the critical skills shortage that exists for high wage jobs in many key industries.

- **Design a vocational training report card.**

  This report card will help students, parents and employers evaluate the effectiveness of vocational training programs. The report card will measure the graduation rates, placement, retention and wage rates in the occupation as well as cost per student for all secondary, post-secondary and vocational/technical programs either receiving funds through the state or licensed by the state.

- **Require welfare recipients and unemployed spouses delinquent in child support to seek work, doubling the number of recipients who get a job through the Work First welfare-to-work job training program.**

  This new requirement will establish Work First as one of the largest welfare-to-work programs in the nation.

- **Fully establish the Michigan Works! local workforce development service delivery system.**

  Michigan will establish the nation's first consolidated employment and training service network so that there are "no wrong doors" for people to access needed services.

Priority Three:

Continue to improve Michigan's overall business climate

Michigan today offers a healthy business climate due to twenty-one tax cuts, a state budget surplus and numerous regulatory reforms. But as business has learned, Michigan is committed to a process of continuous improvement to keep the state competitive for job growth.

- **Implement Renaissance Zones to provide economically depressed areas market-based economic growth incentives.**

  Through a competitive application process, Renaissance Zones will enable economically depressed communities the opportunity to provide virtually total state and local tax relief to both residents and businesses in the zones. These zones would provide market-based incentives for people to establish or maintain residences, retail shopping or other businesses in the zones to renew the community's economic vitality.

- **Develop a strategy and build consensus for improving the competitiveness of Michigan's local personal property tax.**

The personal property tax creates an economic disadvantage for Michigan job providers as it discourages capital investment and is not levied by many other competitor states.

- **Advocate for improving the competitiveness of Michigan's electric utility rates for commercial and industrial businesses.**

Michigan's commercial and industrial electric rates are on average 15% higher than our competitor states. A gradual transition to open competition for power generation, introducing competition for new business expansions and developing wholesale power pools will position Michigan to introduce market forces to electric power rates, while maintaining the integrity of the state's electricity reliability.

- **Develop a strategy and build consensus for improving the competitiveness of Michigan's workers' compensation costs.**

Michigan's average workers' compensation rates have been declining and are now at the national average. However, high cost rates in certain industrial classifications, recent court rulings that put the system at risk of future cost increases and the lack of adequate fraud provisions require further action to make the system competitive.

- **Work with the Department of Environmental Quality to design a "clean corporate citizen" permitting system.**

Many companies with an established history of environmental compliance must deal with the same hassles of the permitting process as those companies without a proven track record. Michigan will establish a system which allows these clean corporate citizens a hassle-free certification process while allowing state resources to focus on those cases warranting more attention.

Return to What is MJC?

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MICHIGAN
JOBS
TEAM
John Engler, Governor

Michigan Plastics Industry Roundtable
P.O. Box 2408 • Portage, MI 49081-2408
Phone/Fax: 616-327-5849 • MPIR@aol.com

MISSION STATEMENT

The Michigan Plastics Industry Roundtable is a business-driven consortium of Plastics Manufacturers established to work in partnership with Education, Government, and Local Communities to organize and develop resources for the purposes of:

- Assessing the industry and its resources throughout the state and serving as a clearing house for plastics programs;
- Promoting a positive image of plastics as a high-growth, high-tech industry providing good career opportunities;
- Enhancing community awareness of the science of plastics manufacturing and recycling;
- Establishing local school-to-work partnerships to increase the number, and skill levels, of young people getting into the industry;
- Supporting the establishment of skills standards and certification to continuously improve the skills of current employees and to enhance their careers;
- Creating a world class plastics industry in Michigan to compete in global markets.

Michigan Plastics Industry Roundtable

EXECUTIVE DIRECTOR
Richard Zinser
RZ Resources

CHAIRPERSON
Larry Eisenga
Blue Water Plastics

VICE-CHAIRPERSON
Diane Timmer
Bissell, Inc.

SECRETARY
John Davis
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MEMBER-AT-LARGE
Art Goodsell
Huron Plastics Group

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Michigan Plastics Industry Roundtable

CONSTITUTION and BYLAWS

1. Name of organization:

The "Michigan Plastics Industry Roundtable", a consortium of businesses and organizations involved in, and supporting, the manufacturing of plastic products, herein referred to as the *Roundtable*.

2. Membership:

a. Persons actively involved in the plastics industry in Michigan.

b. Professional associations, technology organizations, educational institutions, trades groups, and the Michigan Jobs Commission may have ex-officio members on the *Roundtable*.

c. Not more than one voting member from an individual company.

d. Members not able to regularly attend meetings are encouraged to designate an alternate member to attend from their company.

e. Anyone wishing to participate on the *Roundtable* may communicate with the Executive Director at 616-327-5489 or the Michigan Jobs Commission at 517-373-7550.

3. Officers and Executive Committee:

a. Officers: Chairperson, Vice Chairperson, Secretary, Treasurer. The duties of the Officers will be consistent with the standard practice for each position.

b. The Executive Committee, herein referred to as the Committee, will consist of the four Officers, two At-large Members (optional), the Executive Director (ex-officio), and a staff person from the Michigan Jobs Commission (ex-officio).

c. The duties and responsibilities of the Executive Director will be outlined in a job description and added as an amendment to this document.

d. Two At-large Members of the Committee will be designated by the Chairperson and will usually serve as special sub-committee persons.

e. The Officers will be elected biannually in January of odd-numbered years.

f. An action of the Committee requires that three of the Officers support the decision.

g. The initial Officers elected on January 15, 1996 are:

Larry Eisenga	Chairperson
Diane Timmer	Vice Chairperson
John Davis	Secretary
Michael Clancy	Treasurer
Art Goodsel	Member-at-Large

4. Meetings:

   a. To be called at the discretion of the Chairperson, approximately 10 per year.

   b. Minutes of the meetings of the Roundtable and the Committee are to be prepared by the Secretary and presented at the next meeting.

5. Committees:

   a. An election sub-committee will be named by the Roundtable in November of even numbered years to prepare nominations for the January election of Officers.

   b. Other sub-committees may be named by the Committee.

6. Elections:

   a. For Officers in January of odd numbered years.

   b. To fill positions due to resignations of Officers the next scheduled meeting of the Roundtable.

   c. A binding vote of the Roundtable will require communication at a meeting, with a vote by the next meeting, with a common majority prevailing.

   d. Elections held at the January meeting require a common majority of Members present.

7. The Treasurer and Chairperson will provide reports to the Roundtable annually or on request of a Membership consensus.

Section II
National School-to-Work Resources

A. National Business Resources

B. National Trade Associations

C. National Skill Standards and Plastics Certification

D. Information From Other States

National School-to-Work Resources

National School-to-Work Resources Center

- The School-to-Work Internet Gateway homepage shows the wealth of information available on the Internet for review and, in many cases, can be downloaded for direct application. In addition to general information, news, and events the site includes many useful products, tools, and up-to-date resource bulletins. The web site address is **http://www.stw.ed.gov**
- The School-to-Work Fact Sheet provides an excellent introduction for both educators and businesses. Of particular interest for new readers may be the part on **dispelling myths about school-to-work.**
- Steps to Creating a School-to-Work Program by Jobs for the Future is a guide for design and implementation. It describes the steps of the entire process and can be used to establish industry and education partnerships. The outline and introduction are included here to show how building a local program needs to be integrated with the national infrastructure. The entire guide is included in Section 4B.

For additional information and resources contact the:

National School-to-Work Information Center
1- 800-251-7236.

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Background on School-to-Work

What Is School-to-Work?

School-to-Work involves schools, businesses, and community organizations working together to provide young people with an education rich in both rigorous academics and practical work-related experience. School-based and work-based learning reinforce each other and teach youth the skills, habits, and attitudes they need to be successful in their careers and throughout their lives. Through School-to-Work, young people have the opportunity to create career pathways and chart their courses for the future.

School-to-Work benefits **all** students — it does not distinguish honors students from vocational education students from general education students. There is a myth that School-to-Work is only for the "non-college bound" and that it will track young people into inferior programs with minimal academic standards, leading them toward dead end, low-skill jobs. In fact, School-to-Work strives to eliminate traditional divisions between academic and vocational learning and uses the best aspects of each, incorporating and emphasizing high academic standards in the workplace and the classroom. Today's high-skills job market demands that high school graduates have advanced academic knowledge and workplace skills.

School-to-Work aligns the reform efforts of schools with the education-related efforts of businesses and community organizations. It ensures that the activities of these major stakeholders — schools, employers, and community groups — all contribute to students receiving a high-quality education. While the models for such an education can take different forms depending on the stakeholders' roles, the outcomes share some common qualities. When School-to-Work initiatives are successful, students finish high school with

- Theoretical and applied knowledge about the workplace;
- A direction for their career futures;
- The skills and abilities for pursuing work, a technical education, or a two- or four-year college education; and
- A strong, academic background.

School-to-Work gives students a practical and learner-focused education that facilitates their entry into the workplace or to higher education. With early involvement initiatives, employers help create a far better prepared workforce that reduces the time-consuming and costly traditional recruiting, hiring, and training efforts. This, in turn, helps companies become more efficient. As our economic base shifts to value-added services, highly skilled yet versatile workers like those that School-to-Work fosters are the key to remaining competitive in the global economy. Finally, we *all* benefit by having our young people become productive, well-rounded, and responsible citizens.

FACT SHEET

SCHOOLTOWORK
OPPORTUNITIES
U.S. DEPARTMENT OF EDUCATION U.S. DEPARTMENT OF LABOR

BUILDING A COMPREHENSIVE SYSTEM, NOT A CATEGORICAL PROGRAM

The School to Work Opportunities Act passed Congress with strong bipartisan support and was enacted in May 1994. Across the nation, thanks in part to the leadership and coherence provided by the legislation, local communities have created programs, and states have passed legislation to knit programs into systems.

The School to Work Opportunities Act is administered by the National School-to-Work Office under the joint direction of the U.S. Departments of Labor and Education. The Act encourages educational and career opportunities for *all* students by creating a framework for business and educational partnerships at the state and local levels. These partnerships help students make the vital connection between what they learn in school and in the workplace and prepare them for good careers and advanced education and training.

Venture Capital Funding

The school-to-work initiative puts in place a clear, comprehensive framework and provides venture capital for states and local partnerships to design systems that help young people make the transition from school to careers and lifelong learning. The initiative does not establish a new program to add to the myriad of existing education and training programs. Rather, it puts in place the infrastructure for a national system that's based on existing models and efforts, such as career academies, youth apprenticeship, Tech Prep, and cooperative education.

In 2001, the legislation sunsets, and school-to-work systems will be institutionalized at the state and local levels. Federal support includes:

DEVELOPMENT GRANTS. In 1994, planning grants were awarded to all 50 states, Puerto Rico and the District of Columbia to produce comprehensive plans for statewide systems. In 1995, seven U.S. territories received development grants.

STATE IMPLEMENTATION GRANTS. School-to-work implementation funds are being rolled out in waves. In 1994, eight states were awarded the first grants with the understanding that their efforts will, in part, inform and improve subsequent efforts. In order to be approved, these statewide plans for school-to-work systems had to:

- Provide local funding to sustain the school-to-careers system after federal funds sunset;
- Coordinate activities from related federal education and training programs, such as the Carl D. Perkins Vocational and Applied Technology Education Act; the Elementary and Secondary Education Act; the Job Training Partnership Act; the Family Support Act; the Individuals with Disabilities Education Act; and the Adult Education Act;
- Stimulate and support school-to-work programs to meet the requirements of the proposal and expand the program throughout the state;

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June 1995

- **Ensure access for all students, including those who are economically disadvantaged; of diverse racial, ethnic, and cultural backgrounds; students with disabilities; students with limited English proficiency; low achieving and academically talented students; and former students who may have dropped out of school;**

- Ensure opportunities for young women to participate in programs that lead to high-performance, high-paying jobs, including those in nontraditional areas.

All states are expected to receive implementation grants by 1997.

LOCAL COMMUNITY GRANTS. In 1994, competitive grants were awarded to 15 communities across the country to pursue a wide range of approaches to preparing students for careers. Some of the grants went to communities that were prepared to implement a school-to-work opportunities program but that are in states that were not yet ready for statewide implementation.

HIGH-POVERTY URBAN AND RURAL GRANTS. In 1994, federal support was given to 21 urban and rural areas characterized by high unemployment and poverty to help them overcome the substantial challenges of building effective school-to-work opportunities systems.

INDIAN PROGRAM GRANTS. Eight development and up to five implementation grants will be awarded in 1995 to schools funded by the Bureau of Indian Affairs in order to serve Indian youth.

WAIVERS. States have the opportunity to seek waivers to provisions of related federal education and job training programs. This is an additional resource to assist in the start-up and implementation of school-to-work opportunities systems and to facilitate coordination between this new effort and existing programs.

Technical Assistance to States and Localities

The National School-to-Work Office will provide technical assistance that reflects a "reinvented" federal role in helping states and local sites build school-to-work systems. This approach lessens the emphasis on cumbersome control and regulation and focuses on: (1) providing information; (2) providing resources; (3) identifying and certifying experts for use by system-builders; (4) providing opportunities for state and local flexibility; and (5) eliminating unnecessary workload and burdens for grantees, allowing them to focus on solving problems and serving people. Specific initiatives include:

- **Learning Communities**, or networks of state, local and urban/rural school-to-work grantees to share information, materials, and best practices.

- **An Information and Learning Center** under the direction of the National School-to-Work Office. The Center will:
  - Serve as the primary broker of technical assistance to school-to-work grantees;
  - Analyze and disseminate information to the field.

- **A Cadre of Experts** identified by the National School-to-Work Office to provide high-quality, timely technical assistance to school-to-work implementation grantee states. The cadre will serve as a "technical assistance resource bank."

FACT SHEET

SCHOOLTOWORK
OPPORTUNITIES
U.S. DEPARTMENT OF EDUCATION U.S. DEPARTMENT OF LABOR

DISPELLING MYTHS ABOUT SCHOOL-TO-WORK

MYTH 1: School-to-work is just another expensive, categorical job-training program.

FACT: The school-to-work initiative puts in place a clear, comprehensive framework and provides venture capital for states and local partnerships to design systems to help young people make the transition from school to careers and lifelong learning. The initiative does not establish a new program to add to the myriad of existing education and training programs, but supports a national system that's based on existing models and efforts, such as career academies, youth apprenticeship, Tech Prep, and cooperative education.

In 2001, the legislation sunsets, and school-to-work systems will be institutionalized at the state and local levels.

MYTH 2: School-to-work is something for the "non-college-bound," or for "somebody else's kid"— not for all students.

FACT: Years ago, non-academic, vocational classes were only for those students who did not plan to go on to college. However, today's high-skill job market demands that *all* high school graduates have *both* advanced academic knowledge *and* workplace skills and training. The school-to-work, or school-to-careers, movement aims to improve the way students are prepared for college, careers and citizenship. The goal is to improve learning through more interesting and relevant experiences that integrate school-based and work-based learning and foster real-world applications of principles and concepts. School-to-work experiences are designed to develop young people's competence, confidence, and connections that can ensure successful careers and citizenship. These result in multiple options—four-year college, two-year college, technical training, skilled entry-level work on a career path, and pursuit of lifelong learning.

MYTH 3: School-to-work is unnecessary because high schools already prepare kids for college and careers.

FACT: Today's workplaces, and those of the 21st century, require a new kind of worker—one who excels at solving problems, thinking critically, working in teams, and constantly learning on the job. In this new global and technology-driven economy, the skills of the workforce are a company's major competitive advantage. Corporate, community, and individual success in this new economy means that our education system has to change, too.

The old "drill and grill" method of educating young people cannot keep up with or prepare all young people for the changing demands and opportunities of modern society. We can no longer afford a two-tiered educational system with high-standards academic preparation for some and low-standards general track or vocational preparation for others. Today's schools must offer *all* students challenging, relevant academics and meaningful work-based learning experiences in their communities.

The consequences of our education system being out of sync with the changing nature of work have taken a toll on American business. More than 50 percent of U.S. employers say they cannot find qualified applicants for entry-level positions. It is estimated that American business spends nearly $30 billion training and retraining its workforce. Until we as a society fully address the mismatch between what and how students are learning in high school and what they will be required to know and do to ensure successful careers, this figure is likely to continue to rise.

The school-to-work, or school-to-careers, movement provides a timely response to these problems, creating a new form of education for a new economy that links learning and earning.

MYTH 4: School-to-work programs continue to track kids into inferior programs of study with low academic standards and dead-end, low-skill jobs.

FACT: At the heart of the school-to-work approach are the twin goals of improving the quality and relevance of education for all students and improving young people's knowledge of and access to career opportunities. School-to-work programs break down the barriers between academic and vocational learning and infuse each with the best aspects of the other. School-to-work programs prepare students to meet high academic standards, and academic knowledge that is not taught in the abstract. Classroom instruction focuses on cognitive and occupational skill development.

High-quality programs incorporate new teaching methods, including inter-disciplinary team teaching, block-scheduling students, project-based instruction, and other instructional and site-based innovations. They are consistent with and supportive of mainstream education reform movements.

MYTH 5: Young people won't want to participate in school-to-work programs.

FACT: Young people want new learning opportunities and are particularly interested in having a chance to learn both in school and on the job. Nine in 10 teenagers in a recent U.S. Department of Labor survey of 500 American teenagers said they were interested in learning both in school and on the job in the school-to-work way. Two-thirds of high school students want to get work experience while in school. Three in four teen workers say their jobs are not preparing them for the careers they want, and 85% of working students say they are learning while working.

MYTH 6: Employers won't become involved in school-to-work partnerships because they're too expensive and do not have immediate payoffs.

FACT: Industry supports school-to-work partnerships because they represent an investment in important "human capital," yielding access to highly trained, versatile workers, certified and knowledgeable in all aspects of an industry. Business today spends about $30 billion yearly to educate its workforce. School-to-work programs provide a competent, trained, and highly educated workforce capable of performing at high levels and prospering in a global economy.

The National Employer Leadership Council (NELC) was founded by 19 CEOs of leading companies to promote work-based learning opportunities for all students in America's schools in collaboration with other business organizations, school systems, public-sector organizations, and federal, state, and local governments. The NELC also aims to enhance the quality of the nation's workforce and improve the productivity and competitiveness of American business in the global economy. NELC members include CEOs of: Ford Motor Company, American Express, BellSouth Corporation, Eastman Kodak Company, Manpower Corporation, New England Medical Center, and Siemens Corporation.

Steps to Creating a School-to-Work Program

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Introduction

Steps to Creating a School-to-Work Program:

- I. Assess Local and State Environment for School-to-Work Program
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- II. Build Initial Design Team
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- IV. Establish Program Structure and Design the Learning Delivery System
- V. Design Program Content
- VI. Establish Rights and Responsibilities of Participants
- VII. Design Orientation and Training Components
- VIII. Design Recruitment and Marketing Strategies

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INTRODUCTION

The purpose of this guide is to outline the steps necessary to create a school-to-work program. Beginning with a scan of the political climate the guide moves through the processes of defining, designing, and marketing the various components of the program.

While the guide presents information in a step-by-step format, it is neither a wholly sequential nor an all-inclusive listing. Many of the steps need to be performed simultaneously; some may not be right for particular settings. This is meant as a planning tool, to help local partnerships begin creating programs that meet their particular needs.

This guide also lists some steps which lie beyond the scope of the average local program–at the state level. This is because we believe that school-to-work must become a *system*, not simply a collection of isolated, local programs endlessly "reinventing the wheel".

National and state legislation is resulting in state-level infrastructure-building. Practitioners at the local level should be alert to the resources and technical assistance that such efforts can bring to their programs. Conversely, local-level program planners have expertise to bring to the table in state system-planning efforts.

By building programs that are both responsive to local needs and connected to the larger, systemic infrastructure, program planners give themselves and their communities the best chance at creating new and enduring pathways to opportunity for young people.

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National School-to-Work Resources

Section II-A:
National Business Resources

- The NELC Employer Participation Model is a concise yet comprehensive document illustrating how companies can work directly with students and teachers, and how to support the work of teachers. It describes the major school-to-work components, such as job shadowing, and includes the who-does-what-by-when information for employers.
- The National Alliance of Business homepage shows another important resource. Also included are a list of NAB publications and member benefits. Their newsletter contains relevant research and statistical reports on the state of workforce development. The web site is **http://www.nab.com**
- School-to-Work at Work: A Guide for the Manufacturing Industry by NAB is a 200-page workbook to help businesses start a program. It features principles, tools, and case studies. Included here is a copy of the contents for awareness only. Note especially the **six driving principles**.

The reader may wish to access other relevant articles by NELC especially Engaging Employers in School-to-Work Systems and Professional Development for Employers in School-to-Work. Both articles include a list of pertinent organizations, case studies of effective practices, and other publications. Recommended readings by NAB include their newsletter Workforce Development Trends and the report How School-to-Work Works for Business.

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National Employer Leadership Council

NELC

Helping Create
Tomorrow's Workforce

Welcome to the National Employer Leadership Council (NELC)

The NELC is a coalition of CEOs from a diverse group of private sector companies with a shared vision for our nation's workforce. The mission of the Council is to enhance the quality of the nation's workforce and to improve the productivity and competitiveness of American Business through work-based learning opportunities for all students.

To accomplish this, the NELC hopes to energize and mobilize the business community around the school-to-work (STW) initiative in collaboration with other stakeholders, including other business organizations, school systems, labor and public sector organizations, parents, students, and state, federal and community leaders.

School-to-work represents a new approach to learning in America. Today, states and localities are building high quality STW opportunities systems that prepare young people for further education and careers in high-skill, high-wage jobs. School-to-work is based on the proven concept that education for all students can be made more relevant and useful to future careers and lifelong learning. Rather than just memorizing facts out of a textbook, students will learn by applying what they learn to real-life, real-work situations.

Member CEOs have pledged to sustain their own work-based learning programs and promote school-to-work issues, both within their own companies, and among the business world and the general public. Alex Trotman, Chairman of Ford Motor Company, is the NELC Chair.

The NELC was launched in December 1994 at a meeting with President Clinton at the White House. The NELC Executive Director and staff are located in Washington, DC and are supported by a grant from the Department of Labor.

For more information on the NELC, School-to-Work and Work-Based Learning, click on the subjects below:

★ School-to-Work Guiding Principles ★
Common principles the NELC believes should guide all STW efforts...

★ NELC Membership Expectations ★

★ Return on Investment ★
Reasons for business interest in STW...

★ Employer Participation Model ★
The What, How, Where and Who of STW for Businesses

★ NELC Member Companies ★

★ Member Company Programs ★

★ Resources ★

★ Questions and Answers ★
Answers to frequently-asked questions about the NELC...

★ NELC Membership Form ★
Sign up now and receive a free resource packet!

For more information on STW and/or business involvement in education, try any of the following web sites:

School-to-Work Opportunities STW Internet Gateway

Jobs for the Future

National Alliance of Business

The NELC may be contacted via e-mail by clicking here, sending information requests to the address below, or signing our new guestbook.

September, 1996
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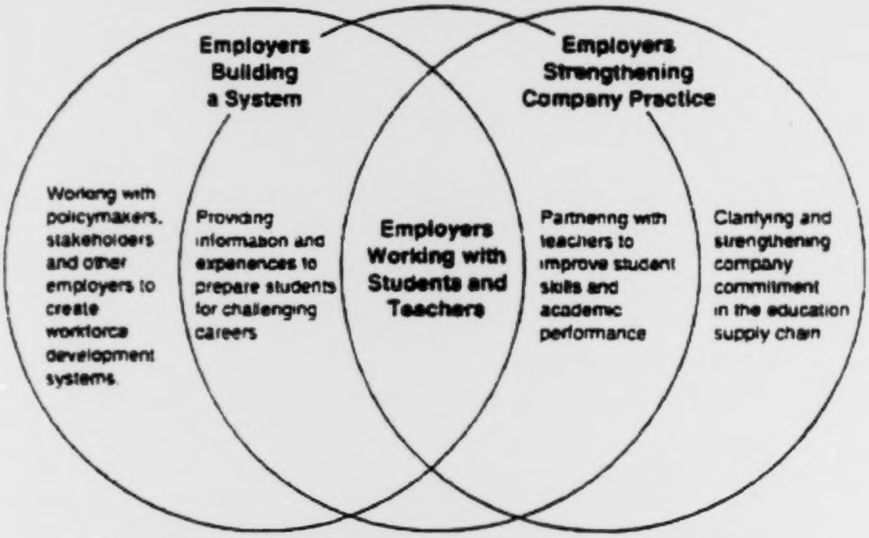
Most Recent Update 11/96

Model

The What, How, Where and Who of STW for Businesses

Employer Participation Model


Employers Building a System
Employers Strengthening Company Practice
Working with policymakers, stakeholders and other employers to create workforce development systems.
Providing information and experiences to prepare students for challenging careers
Employers Working with Students and Teachers
Partnering with teachers to improve student skills and academic performance
Clarifying and strengthening company commitment in the education supply chain

"Connecting Learning and Earning"

The NELC recognizes BellSouth, American Express, Alamo Rent-A-Car, Inc., Ceridian Corporation, Eastman Kodak Company, Ford Motor Company, Peavey Electronics, and Siemens Corporation for their leadership in creating the model and gratefully acknowledges Jobs for the Future for their assistance in its development.

Employers Working Directly With Students

Employers Working Directly With Teachers

Employers Supporting the Work of Teachers

Employers Strengthening Company Practice

Employers Building A System

Employers Working Directly With Students

Employers can offer students a variety of opportunities to understand the kinds of work that today's workforce does every day and the link between "Learning and Earning." This chart

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describes activities in which your company could participate in the schools in your communities.

Purpose	Employer Activity (Grade Level)	Length of Activity	Employee to Student Ratio*
Career Awareness	**Career Talks:** Employers and employees visit students in the classroom and explain the work in their industry or company. (K-16)	1-2 hours	1:25 or 30
	Career Days/Career Fairs: Special events are typically held to allow students to meet with postsecondary educators, employers and employees, or human resource professionals to learn about education and work opportunities. Career day activities are designed to help students think about their interest and abilities in relation to potential careers. (K-16)	2 hours to half-day	varies with type of setting
	Workplace and Industry Tours: Students visit the worksite, talk with employees and observe the workplace activities. (K-16)	1-2 hours	1:10 or 25
Career Exploration	**Job Shadowing:** A student follows an employee at a company location to learn about a particular occupation or industry. Job shadowing can help students explore a range of career objectives and select a career major for the latter part of high school. (6-16)	varies, one day to 2 weeks	1:1-5
	Job Rotations: At a worksite, students transfer among a number of positions and tasks that require different skills and responsibilities in order to understand the steps that go into creating a product and/or service; how their own effort affects the quality and efficiency of production and customer service; and how each part of the organization contributes to productivity. (9-16)	varies by program	1:1 to 8
Career Preparation	**Internships:** Students work for an employer for a specified period of time to learn about a particular industry or occupation. Students' workplace activities may include special projects, a sample of tasks from different jobs, or tasks from a single occupation. These may or may not include financial compensation. (10Ð16)	minimum of one semester 5-10 hours a week or a summer session full time for 4-6 weeks	1:1 to 8

	Cooperative Education: Students alternate or coordinate their high school or postsecondary studies with a job in a field related to their academic or occupational objectives. Students and participating businesses develop written training and evaluation plans to guide instruction, and students receive course credit for both their classroom and work experiences. Credit hours and intensity of placements often vary with the course of study. (10 16)	minimum of 3 hours a week for one semester	1:1 to 8
	Youth Apprenticeship: A multi-year program that combines school and work-based learning in a specific occupational area or occupational cluster and is designed to lead directly into either a related postsecondary program, entry-level job or registered apprenticeship program. Youth Apprenticeships may or may not include financial compensation. (10-14)	minimum of one semester 5-10 hours a week	1:1 to 8
	Apprenticeship (Registered): Registered apprenticeship programs meet specific federally approved standards designed to safeguard the welfare of apprentices. The programs are registered with the Bureau of Apprenticeship and Training (BAT), US Department of Labor, or one of 27 State Apprenticeship Agencies or Councils approved by BAT. Apprenticeships are relationships between an employer and employee during which the worker, or apprentice, learns an occupation in a structured program sponsored jointly by employers and labor unions or operated by employers and employee associations. (13-16)	defined by the program	defined by the program
	Mentoring: Employee(s) who possess the skills and knowledge to be mastered by a student, and who instructs the student, critiques the performance of the student, challenges the student to perform well, and works in consultation with teachers or youth organizations and the employer of the student. (9-16)	minimum of 10 months, 3-4 hours a month	1:1 or 2

Employers Working Directly With Teachers

Secondary and post-secondary faculty want to spend more time with business partners to increase their understanding of the culture and expectations of the workplace. This chart identifies partnership activities and points of contact for start-up. Often, the resources are already available through industry and business organizations or from other business partnerships in other communities and states. Employers can also support the work of teachers directly and indirectly in local classrooms.

Teacher Activities	Employee Role
Project-Based Learning	Serve as mentors and collaborate with students onprojects aimed at providing solutions to real problems and developing new programs within the company.
School-Based Enterprise/ Entreprenurial Projects	Provide expertise as consultants to student-operated businesses. Serve as a guide to a group of students as they assess, design and implement a start-up business.
Internship/Externship/ Sabbatical in Business	Provide opportunities for educators to explore an industry or company to develop their knowledge of workplace skill requirements.

Employers Supporting the Work of Teachers

This chart identifies five ways that employers can contribute to the quality of the classroom experience.

Teacher Activity	Employer Role	Where and How
Curriculum Development	Work with educators at the national and state level to integrate curriculum to link academic and workplace knowledge and skills; to logically connect work with educators at the regional and local levels to develop work-based learning curriculum such as Tech-Prep.	• Contact your industry association to participate in Skill Standards development and assessment. • Contact your Chief State School Officer and offer to write and/or review STW curriculum. • Meet with local school officials and give them copies of the industry developed skills and curriculum for integration into their programs.

Instructional Materials	Work with educators at the national and state levels to develop compatible, inexpensive products, services and software to support the teaching of workplace and industry skills and knowledge.	• Contact your industry association to see what materials are currentl • Contact state industry and business associations to see what materials are available. • Contact your human resource and training departments to find qualified staff to participate in materials development.
Business Practice Advisement	Provide information and support to counselors and te	• Contact schools or community organizations volunteer
Industry Skill Standards	Give copies of your industry skill standards to secondary and post-secondary educators for use in their program planning. Connect educators to industry skill standards implementation projects that integrate skill standards, academic standards, and workplace experience.	• Contact your industry association to see what materials are currentl • Contact the School-to-Work Learning Center for names of implementation projects. Call the project directors and ask for information.
Technology	Provide educators with information and support to increase their awareness and skill development of current technology. Provide access to technology.	• Contact your local business organization to inquire about programs that give teachers access to workplace resources.

Employers Strengthening Company Practice

Business culture has changed with the introduction of continuous improvement practices, strong "customer service" orientation, new technologies, and increasing webs of vendor relationships. In order to develop a qualified and committed workforce, some business practices need to change to support the new relationship with education providers. This chart captures four areas where your company together with your industry association(s) can focus attention.

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Company Practice	**Company Action**	**Who**
Communicate Supplier Expectations	Participate in development of "Skill Profile" requirements. Communicate information to all workforce providers or suppliers. (See Chart 4 under national and state, Chart 2-A under curriculum development.)	Human Resources/Community & Volunteer Programs/Industry Association
	Develop internal tracking system to follow supplier/provider graduates hired, retained and promoted and share that information with your supplier network.	Human Resources
Enhance Employment Practices	Implement hiring practices that will require applicant to demonstrate academic achievement and workplace experience through school-based records (e.g., provision of transcripts, portfolios, certificates of mastery, industry skill standards certificates)	CEO and Senior Management
	Re-engineer employment practices to use educational institutions as preferred suppliers.	Human Resources
	When screening and recruiting for employees, consider the work-based	Human Resources
	Advocate strong policy to align and integrate training and educational systems.	Government Relations/Industry Association
	Participate in local STW/career preparation programs.	Line Managers and Employees
	Use local education and training institutions and organizations as supplier for current workforce.	CEOs and Senior Management
	Identify the cost of hiring, training and turn over for new entry-level and compare annually with information from tracking systems explained above.	[redacted]

Encourage Employee Development	Partner with institutions in the supplier chain, (e.g., high schools, community colleges, adult schools, and universities) to develop both industry and company specific classroom and workplace learning services.	Line Managers
	Engage labor unions in work-based learning opportunities in companies with collective bargaining agreements.	Labor Relations Managers
	Prepare employees to supervise students in defined work-based learning opportunities.	Human Resources
	Incorporate skill standards as a framework for internal education, training, career development and performance review for current workforce.	Human Resources/Government Relations
	Profile champions in the company that support education priorities through your company newsletter.	Communications
Extend Corporate Leadership	Conduct high visibility review of existing involvement in education reform, prioritization of activities, commitment of resources, and CEO/Senior Management attention.	CEO and Senior Management
	Encourage employees to become involved in education activities as parent, community volunteers, and school board members - and recognize their efforts.	CEO & Senior Management/Community & Volunteer Programs
	Adopt policies to support parental involvement in their children's education and in local school improvement initiatives.	CEO & Senior Management/Human Resources
	Align corporate resources including government relations, corporate philanthropy, volunteerism and personnel policy with corporate education priorities.	CEO & Senior Management
	Align company involvement in industry and business associations that strengthen the connection between earning and learning.	Government Relations/Industry Associations

	Create senior management briefing on company commitment to high standards, workforce development, quality assessments and accountability.	Government Relations/Industry Associations
	Insert comments in Senior Management speeches that advocate for a "system that supports high quality workforce devel	Communications
	Write CEO editorials in industry and business magazines that address the need for workforce and career preparation that will support our economic success.	Communications/Industry Associations
	Focus volunteer efforts on education partnerships and STW/ career preparation initiatives in your community.	Community & Volunteer Programs
	Recognize community partnerships with events that showcase employer involvement and commitment.	Community & Volunteer Programs
	Participate on local school boards and parent and partnership boards.	Line Managers and Employees

Employers Building A System

America needs a higher-skilled workforce and American education is the primary source for that upgrade. Business working at every level of decisionmaking can bring focus and practical experience to workforce development. This chart lists recommendations at four levels that will support system development. The NELC strongly supports early and continued participation of the broadest possible groups of stakeholders.

Level of Involvement	Building A System Focused On High Standards And Global Competitiveness

Local	• Provide leadership - through an employer-led organization - to develop workbased learning opportunities across all key industries and a process to continuously provide skill standards information to all education institutions. (Descriptions of those activities can be found in Chart 3) • Provide leadership to create or enhance the regional economic development plan so that education, labor market needs and public and private resources are aligned to support quality workforce development programs. • Play a leadership role in the development of work-based learning opportunities in local partnerships of employers, local education agencies, schools, educators, locally elected officials, employees, labor organizations, students, parents, community-based organizations, rehabilitation agencies, vocational education agencies and other local entities.
*State/Region**	• Provide, through business and industry associations, leadership in state/regionwide workforce development and STW governance (e.g., Workforce Development Boards, PICs, Chambers of Commerce., Business Roundtables). • Work with stakeholders to create a system of industry recognized workplace assessments and credentials for use in schools and in the workplace. • Provide marketing and employer recruitment support using the Employer Participation Model as a tool. • Influence government to develop business incentives for employer involvement (e.g. tax credits, etc.)
National	• Join NELC to work with other business organizations and employers to assure a consistent STW and Workforce Development focus in and across business organizations. • Promote STW and Workforce Development efforts in national industry specific associations and participate in the development of industry driven skill standards. • Participate in the development of skill standards driven curricula and instructional materials with special focus on high academic standards and workbased learning. Encourage the use of these materials in industry related programs at the state and local level. • Participate in development of a national benchmarking effort to identify best practices in an array of program components that continuously improve the STW and workforce development programs (e.g., how to recruit employers, selection and assessment of work-based learning activities by students and parents, and teacher internship/externship).

NATIONAL
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BUSINESS

From School to Work: An Overview

The workplace is changing dramatically. To succeed on the job today, employees must be smarter and more skilled than at any time in history. In addition, today's changing job requirements mean that we must have the ability to continue learning throughout our lives. School-to-Work provides the critical connection between the learning that occurs in the classroom and the knowledge that is developed in the workplace.

School-to-Work helps employers improve the quality of their workforce by offering students an opportunity to learn in school and on the job. Businesses that participate in School-to-Work programs provide students--and often their teachers and parents-- an early glimpse at the skills required for success in today's workplace. By making school more relevant and exciting, School-to-Work initiatives motivate young people stay in school and do better while they are there. This excitement, in turn, often leads to rewarding employment and future learning opportunities. At the same time, School-to-Work is changing the ways that businesses recruit employees, train entry-level workers, profit from hiring decisions, and compete in a global economy.

In this section you will learn how the National Alliance of Business brings school and work together. We help to form partnerships between educators and employers, make connections between learning and doing, and smooth transitions between school and work. In partnership with schools and businesses, the Alliance works in communities to replicate education and training programs that help students make a successful transition from school to work..

The Alliance adds unique value to the School-to-Work enterprise. We provide technical assistance and training, conduct research and development, shape public policy, and advocate changes to our education system. Our focus is on creating worksite learning opportunities for students, and on ensuring that business' hiring needs are met through the availability of qualified entry-level workers, prepared for work with industry-specific skills and knowledge.

To ensure that our school-to-work activities are driven by business, we have assembled a Business Advisory Board consisting of representatives from actively involved businesses. This group provides guidance on the Alliance's School-to-Work activities and products. Individual representatives share practical resources from their company's programs, present at industry and education conferences, and/or participate in NAB's business mentor bank, assisting their business peers who are ready to begin developing school-to-work initiatives in their communities.

NATIONAL
ALLIANCE OF
BUSINESS

Re-entering the Workforce: An Overview

Over the past fifty years, a substantial network of publicly-funded training and employment programs has developed in the United States. Designed to help unemployed, displaced, disadvantaged, and inexperienced Americans secure employment, the system has gone through its share of successes, failures, and transformations over time. The Alliance focuses on helping companies benefit from public-sector reemployment programs, helping workforce development professionals better understand the system, and outlining ways to improve the system so it better meets the needs of businesses in today's competitive market.

National Alliance of Business
Associate Membership Benefits

Individuals Working to Build A Quality Workforce

To meet the challenge of building an educated and skilled workforce which is internationally competitive and dedicated to continuous improvement, the Alliance works together with local leaders and concerned citizens across the country – always underscoring the need to adequately prepare young people with the skills necessary to succeed at school, at work, and in life

The Alliance's depth of resources and expertise ensures members have the most complete and up-to-date information on the full spectrum of workforce development issues. Educators, training specialists, workforce professionals, community activists, and parents concerned about education and employment issues can utilize the resources of the National Alliance of Business to strengthen their own community efforts.

Associate Membership in the Alliance Helps . . .

Training Specialists — Access the latest tools and information on high performance workplaces, skills standards, workplace literacy, work restructuring, and leveraging public resources.

Educators — Better understand workforce needs and how to work with business to improve local schools and successfully transition young people from school to the workplace.

Community Leaders — Support efforts to increase business involvement in education, reemployment training programs and overall workforce improvement initiatives.

Concerned Citizens — Become better advocates and participants in the process to improve schools and workforce quality in their community.

Parents — Understand how to become more directly involved in their children's education, preparing them for work in today's internationally competitive workplace.

Workforce Professionals — Develop a competitive workforce by providing information on high-performance organizations, work-restructuring strategies and effective training programs.

As an Associate Member You Will Receive . . .

☆ ***WorkAmerica*** - Award winning monthly newsletter highlights best practices in education reform, school-to-work transition, training and quality workforce program with regional inserts focusing on local initiatives. *10 issues per year.*

☆ ***Legislative Updates*** - Timely updates informing you on key federal legislative and regulatory initiatives that affect workforce quality and education. *8 issues per year.*

☆ ***Workforce Economics*** - A bimonthly periodical highlighting current data, evolving trends and analysis of training and workforce quality issues. *6 issues per year.*

☆ ***Invitations*** - to meetings, seminars and workshops, as well as specific training sessions, sharing the expertise and best practices of others and providing up-to-date information.

☆ ***Publications and Materials*** - Updates and reviews on a wide range of new publications, videos, "how to" guides and assessment tools, with discounts to associates.

☆ ***Assistance on the Internet*** - Workforce Development guides, checklists, briefs, instruction and staff training materials and a calendar of workforce development activities nationwide are available on the Internet.

Associate Members also have the opportunity to provide input through periodic surveys on workforce development issues - the results which are published and made available to members, the media, policy makers and others.

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School-to-Work at Work: A GUIDE FOR THE MANUFACTURING INDUSTRY

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JOBS FOR THE FUTURE

NATIONAL ALLIANCE OF BUSINESS

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The Six Driving Principles of School-to-Work

School-to-Work adapts to the communities it serves. While the variations are significant, successful School-to-Work initiatives have the following core principles in common:

PRINCIPLE 1

Broad coalitions of partners govern the program.

PRINCIPLE 2

Employers provide structured sequences of worksite learning.

PRINCIPLE 3

Schools and worksite learning are coordinated and integrated.

PRINCIPLE 4

High school and postsecondary learning are linked.

PRINCIPLE 5

Students are in contact with at least one adult worker.

PRINCIPLE 6

Students receive recognized academic and occupational credentials.

Section II-B:
National Trade Associations

- The Society of the Plastics Industry (SPI) is the "industry spokesperson" on many important issues including **worker training**. The SPI homepage shows the kinds of topics and activities that the association is involved in. The web site is **http://www.socplas.org.** Of particular interest is the Plastics Today menu of information which is available by fax. Also included is a list of the officers for the SPI Michigan Chapter.

- The American Plastics Council (APC) is affiliated with SPI. The APC homepage shows their involvement in national issues. The web site is **http://www.plasticsresource.com.** Also included are several pages of resources for **high schools**.

- The Society of Plastics Engineers (SPE) homepage includes their objective, mission, and goals. The web site is **http://www.4spe.org.** SPE is an international association dedicated to technical and professional development. Also included are the lists of officers for the SPE Detroit Section, the Western Michigan Section, and the Mid-Michigan Section.

- There are 35 Plastics Trade Publications which readers may want to utilize as resources.

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The Society of the Plastics Industry, Inc.
Welcome
About SPI
Member Benefits
Trade Shows
Literature
General Plastics Information
Government Affairs
News & Events
Industry Segments
SPI

About SPI | Member Benefits | Trade Shows | Literature

General Plastics Information | Government Affairs | News & Events | Industry Segments

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The Society of the Plastics Industry, Inc.

The Society of the Plastics Industry, Inc. is a member-run association dedicated to promoting and protecting continuing growth for the plastics industry in the United States. The Society represents more than 2,000 member companies.

Incorporated in 1937, SPI has grown with the dynamic industry it represents. SPI's 27 operating units and more than 200 committees have membership drawn from all segments of the industry — processors, resin and adjuvant suppliers, plastics distributors, machinery builders, and moldmakers. The Society serves as a federation of semi-autonomous, interrelated groups with a strong common interest in the overall health of the plastics industry.

SPI serves as the "industry spokesman." It identifies and provides positive responses to misinformation and to potentially harmful regulations, bills, or court decisions by gathering pertinent facts and carrying out programs for timely and forceful action. At the same time, SPI works to prevent such damaging situations from occurring by building a positive understanding of the industry. The Society's service committees provide liaison with government agencies, code and regulatory groups, and many other associations.

SPI sponsors research projects in areas such as resource recovery, combustibility, and worker safety at major private research organizations. The Society conducts numerous information programs, providing literature, surveys, reports, newsletters, and handbooks for industry and public use. SPI also sponsors the largest plastics industry trade show in North America – the triennial NPE. The next NPE is scheduled for June 16-20, 1997 at McCormick Place in Chicago, IL.

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PLASTICS TODAY

CURRENT INFORMATION ABOUT THE PLASTICS INDUSTRY

Plastics Today Fax # 800 - 774 - 4614 US Only
In D.C. area 202 - 371 - 9841

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Document #2000

MENU (Ext. 2000)

(As of 9/11/96 –Updated regularly)

Information for Schools (K-12)

Ext. 2409	Reaching Out to Schools: Identifying Your Audience (2 pgs)
Ext. 2301	Schools: A Valuable Gateway to Your Community - Summary of Available Materials (2 pgs)
Ext. 2302	How to Set Up a School Recycling Program (4 pgs)
Ext. 2303	"Talking Trash to Teenagers" — Outline of a Speech for Delivery to Middle School Students (1 pg)
Ext. 2403	Getting Involved With Schools Through Junior Achievement (2 pgs)

Employee Programs (and Newsletter Information)

Ext. 2100	**99 Ways To Get Involved In Your Local Community - NEW! (3 pgs)**
Ext. 2407	*Educate and Involve*: Reaching Out To Employees (2 pgs)
Ext. 2450	Payroll Stuffer Sample for Employees with feedback card (2 pgs)
Ext. 2451	Plant Employee Bulletin Board Posters (2 pgs)
Ext. 2452	"Ask Judd" - Q&A articles about the environment - for employee newsletters (3 pgs)
Ext. 2351	Closing the Recycling Loop - Summary of Reference Booklets on Recycled Products and the Companies Who Use Recycled Content (1 pg)

Case Histories / Success Stories in Communities

Ext. 2425	Plant Tours Open School Children's Eyes - KONA Corp. (1pg)
Ext. 2426	Recycling Project Blossoms from Kindergartners to Senior Citizens – Michigan Plastic Products (2 pgs)
Ext. 2427	Vinyl Industry Helps Build Affordable Housing in Washington, D.C. – Habitat for Humanity Project (1 pg)
Ext. 2428	Blue Water Plastics Leads Community Recycling Effort (1 pg)
Ext. 2429	Van Dorn Demag Supports Local "Junior Achievement" Program (2 pgs)
Ext. 2430	Robin II Recycles Resources and Boosts Image (1 pg)
Ext. 2431	Viatec Leads Community Vo-Tech Education Effort (2 pgs)
Ext. 2432	Landis Plastics Changes Attitudes - One Person at a Time (2 pgs)
Ext. 2433	Companies' Educational Partnership Builds Skills, Visibility - Hoffer Plastics Corporation (2 pgs)
Ext. 2434	Offering Magic Solutions to Industry Challenges - Husky Injection Molding Systems (2 pgs)
Ext. 2435	Oregon State Fair - Plastics Industry Booth a Big Hit! (2 pgs)
Ext. 2436	Nyloncraft's Educational Partnership - Key To Finding and Keeping Skilled Workers (2 pgs)
Ext. 2437	Louisville Plastics Network - Kentucky Alliance is Model for Employee Training and more (2 pgs)
Ext. 2438	Berry Plastics' School Program is Educating Kids - Reaching Adults (2 pgs)
Ext. 2439	Chroma Corp.: First-Ever Community Programs Come With Small Challenges, Bigger Benefits (2 pgs)
Ext. 2440	Rockford Consortium: Trains Some, Educates Many (2 pgs)
Ext. 2441	Cowan Plastics - Educates Community - Gains More Skilled Workers (2 pgs.)
Ext. 2442	Prestige Mold, Inc. - Training Program Addresses Employee Recruitment Challenges (2 pgs)
Ext. 2443	Plastics Industry Helps Revitalize Atlanta Neighborhood - A Habitat for Humanity Story (2 pgs)
Ext. 2444	For Jatco, Inc. - Community Involvement means Community Education (2 pgs)
Ext. 2445	Colt's Plastics: Community Involvement A Top Priority (2 pgs)
Ext. 2446	For Stan Cast Moldmaking, Community Involvement is a Philosophy...It's Also Good Business (2 pgs)
Ext. 2447	Mack Molding - Community Investments Yield Big Returns (2 pgs)

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"Plastics Today" Menu

Recycling

Ext. 2351	Closing the Recycling Loop - Summary of Reference Booklets on Recycled Products and the Companies who Use Recycled Content (1 pg)
Ext. 2352	Perfecting the Plastics Drop-Off (2 pgs)
Ext. 2353	Educating Your Community About Plastics Recycling (2 pgs)
Ext. 2354	How to Collect Plastics for Recycling (2 pgs)
Ext. 2355	How to Develop a Viable Post-Consumer Handling Business (2 pgs)
Ext. 2356	Stretch Wrap Recycling (2 pgs)
Ext. 2357	Heartland Institute's "When Should We Recycle?" (2 pgs)

"How-To" Guides

Ext. 2401	Tips on Making Speeches (2 pgs)
Ext. 2402	Giving a Plant Tour (3 pgs)
Ext. 2403	Getting Involved in Schools With Junior Achievement (2 pgs)
Ext. 2404	Keep America Beautiful - How to Stretch Your Community Involvement Resources (2 pgs)
Ext. 2405	How to Publicize Your Company's Community Involvement Efforts and How to Write a Press Release (3 pgs)
Ext. 2406	2 Sample Press Releases (3 pgs)
Ext. 2407	*Educate and Involve*: Reaching Out to Employees (2 pgs)
Ext. 2408	*Opening Doors*: Reaching Out to Government in Your Community (2 pgs)
Ext. 2409	Reaching Out to Schools: Identifying Your Audience (2 pgs)
Ext. 2410	Reaching Out to Community Organizations (2 pgs)
Ext. 2411	Reaching Out to Local Media (2 pgs)
Ext. 2412	Reaching Out to Customers and Suppliers (2 pgs)

(Updated 5/6/96)

Economic Information on the contribution of the plastics industry to the economies of individual states, including comparable national statistics (1 pg summaries):

Alabama	**Ext. 2221**	Indiana	**Ext. 2207**	Nebraska	**Ext. 2236**	So. Carolina	**Ext. 2244**
Alaska	**Ext. 2222**	Iowa	**Ext. 2228**	Nevada	**Ext. 2237**	So. Dakota	**Ext. 2245**
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Illinois	**Ext. 2206**	Montana	**Ext. 2235**	Rhode Island	**Ext. 2243**		

Benefits of Plastics in:

Ext. 2113	Aerospace (2 pgs)	**Ext. 2117**	Packaging (3 pgs)
Ext. 2114	Building and Construction (2 pgs)	**Ext. 2118**	Transportation (2 pgs)
Ext. 2115	Electronics (2 pgs)		

Plastics and the Environment - Questions and Answers:

Ext. 2106	Plastics (2 pgs)	**Ext. 2110**	Incineration (1 pg)
Ext. 2107	Plastics and Energy Efficiency (1 pg)	**Ext. 2111**	Landfills (1 pg)
Ext. 2108	Waste Reduction (2 pgs)	**Ext. 2112**	Resource Conservation (1 pg)
Ext. 2109	Recycling and Recover (4 pgs)		

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"Plastics Today" Menu

General Information / Resources

Ext. 2101	Life of a Plastic Bag (2 pgs)
Ext. 2102	Plastics Packaging: Opportunities & Challenges (2 pgs)
Ext. 2103	Five Major Myths About Garbage, and Why They're Wrong (2 pgs)
Ext. 2104	Fast Facts About Polystyrene (2 pgs)
Ext. 2119	Heartland Institute's Plastics and the Environment - Villain or Friend? (2 pgs)
Ext. 2120	Plastics and the Environment - Quick Facts (3 pgs)
Ext. 2121	Plastics and Marine Debris - (1 pg)
Ext. 2122	National Plastics Center & Museum - A Fun Resource You Can Use (1 pg)
Ext. 2123	The American Plastics Council Opens Internet Web Home Page - *Plastics Resource* (1 pg)
Ext. 2124	SPI Resin Identification Code - Guide to Correct Usage (3 pgs)

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American
Plastics
Council

THE AMERICAN PLASTICS COUNCIL

The American Plastics Council (APC) is a national trade association whose mission is to actively demonstrate that plastics are a preferred material and a responsible choice in a more environmentally conscious world. APC, a joint initiative with The Society of the Plastics Industry, Inc. (SPI), works on behalf of the overall plastics industry to enhance the integrity of plastics with customers, the public and others by focusing on resource conservation issues and product benefits. These activities are conducted in concert with, and supplement, the programs of the product-specific associations within the plastics industry.

APC's strategy through technical, communications, government relations and grassroots support is to:

1. Demonstrate the benefits of plastic products and the contribution of the plastics industry to the society; and simultaneously,

2. Demonstrate that plastics are an efficient use of natural resources, and that plastics and the plastics industry are part of the solution to the public's environmental performance expectations through the following:

   - informing opinion leaders and the public about plastics' advantages in resource conservation and the progress the industry continues to make;
   - supporting integrated approaches to waste management by:
     —assisting increased plastics recycling that is environmentally responsible and economically sustainable;
     —developing meaningful measures of environmental performance, including better methodologies for determining recycling rates;
     —working to ensure the energy value of plastics is captured where practical.

Programs designed to meet specific APC objectives are: Plastics Performance Benefits -- enhancing the profile of the industry's products through APC's national advertising campaign and coordination of industry community and grassroots communications efforts; Waste Prevention -- broadening acceptance of plastics resource management benefits related to source reduction, packaging delivery efficiency, and energy savings in the production of materials; Recovery -- promoting integrated solid waste management solutions that include recycling, reuse and conversion to intermediate fuels; Packaging -- improving the efficiency of recovering, collecting and processing post-consumer plastics packaging; and Durables -- evaluating and promoting recovery technologies for durables goods.

APC is also dedicated to working with businesses that use plastic in their manufacturing process to communicate the importance of the industry in the economy to public policymakers by conducting government relations outreach at the federal, state and local levels, and monitoring the legislative and regulatory climate.

A Joint Initiative with The Society of the Plastics Industry, Inc.
First National Bank Building 332 Minnesota Street Suite E-916 • St. Paul, MN 55101-1311 • Fax 612.222.6057 • 612.222.8628

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PLASTICS Resource™

The information in this site has been organized and formatted to meet the needs of specific user groups. Please select the group you belong to, or category of information in which you are most interested.

This just in...Win a trip to France! The American Plastics Council is sponsoring a National Plastics Reuse It Contest. Check out the details, enter and win!

Academics
For educators, formatted into three levels: Graduate School and College; High School; and Grade School.

Industry & Allied Associations
APC-member organizations and users, and industry personnel.

Students
For students, formatted into three levels: Graduate School and College; High School; and Grade School.

Media
Journalists and users interested in press information and media contacts.

Environmental Information
Users interested primarily in environmental news and issues.

State & National Profiles
Profiles on the plastics industry's environmental initiatives and economic presence.

Consumers
Users interested in consumer information and learning about products made from recycled plastics.

Technical Professionals
Engineers, scientists and other technically oriented professionals.

Search Capability
Dynamically pinpoint the information you want.

Guest Book
Sign the guest book and you will be entered into a drawing for a free magazine subscription.

This site is best viewed using the Netscape 3.0 browser.

For more information contact the APC at 1-800-2-HELP-90
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SOCIETY OF PLASTICS ENGINEERS
The International Plastics Society

SPE OBJECTIVE

Society of Plastics Engineers (SPE) is dedicated to helping you attain higher professional status through increased scientific, engineering, and technical knowledge.

SPE has over 37,500 members around the world involved in engineering, design, production and processing, research and development, consulting, marketing and sales, purchasing, education and all levels of management.

SPE MISSION

To promote the knowledge and education of plastics and polymers worldwide.

SPE GOALS

1. Be the leading technology society for the plastics industry.
2. Be the preferred supplier of engineering, scientific and business knowledge required by the SPE membership.
3. Have the financial base to facilitate SPE operations through the year 2010.

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Society of Plastics Engineers
Western Michigan Section

October 17, 1996

Rick Zinser
Kalamazoo County Education for Employment
1220 Howard St.
Kalamazoo, MI 49008

Dear Rick,

Speaking for the Board of Directors of the Society of Plastics Engineers, Western Michigan Section, thank you for reciept of your grant application. The board has considered your requests and has approved a $700.00 grant to help fund the purchase of various magazine subscriptions and AutoCad Software.

The grants will be presented during our November 11th, 1996 meeting. The location will be at the Holiday Inn North (Ann Street), Grand Rapids. The dinner will start at 7:00 p.m. with presentations directly after dinner.

Please plan to attend this meeting, in keeping with the policy of our section, attendance is required to receive your grant. If you are unable to attend it is required that you send a representitive in your place, one complimentary dinner ticket voucher will be available for you or your representitive at the door.

This year, as in the past, the SPE requests that a picture of the purchased item in use with the instructor and students be provided to section. This allows your school to remain eligible for next year's SPE educational grants. The picture will be published in our monthly news letter to show our members how plastics education is supported.

Please introduce yourself to me on November 11th to confirm your attendance. If you have any questions about the grant or meeting please feel free to give me a call at 616-668-3397 during the day.

Sincerely,

Greg Wasinski

Dave Felicijan
Education Chairmen

Greg Wasinski
Education Vice Chairmen

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"The objective of the Society shall be to promote scientific and engineering knowlege relating to plastics"

Officers and Directors are listed on the back.

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SECTION/DIVISION Mid-Michigan Section NUMBER 46

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PLASTICS TRADE PUBLICATIONS
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Adhesives Age 6151 Powers Ferry Rd NW Atlanta, GA 30339-2941	Larry Anderson Editor	404/955-2500 404/955-0400
American Paint & Coatings Journal 2911 Washington Avenue St. Louis, MO 63103	Joe Maty Editor	314/534-0301 314/534-4458
Chemical Engineering 1221 Avenue of the Americas New York, NY 10020-1001	Richard Zanetti Editor in Chief	212/512-2921 212/512-4762
Chemical Processing 301 E. Erie Street Chicago, IL 60611	Michael Hrickiewicz Managing Editor	312/644-2020
Chemical Week 888 7th Avenue, 26th Floor New York, NY 10106-2698	Esther D'Amico	212/621-4900 212/621-4950
Chemical Week 1253 National Press Building Washington, DC 20045	Peter Fairley Bureau Chief	202/628-3728 202/628-3628

Chemistry & Industry 14/15 Belgrave Square London SW1X 8PS ENGLAND	Andrew Miller Editor	171/235-3681 171/235-9410
Design Cost & Data 8602 N. 40th Street Tampa, FL 33604	Greg Campbell Managing Editor	813/989-9300 813/980-3982
Food Packaging Bulletin PO Box 410 Kingston-Upon-Thames Surrey, UK KT1 4YE	Dr. Leo Katan Editor	44-(0)-181-943-1226 44-(0)-181-943-1226
Injection Molding Magazine 55 Madison Street Suite 770 Denver, CO 80206	Suzy Witzler Editor	303/321-2322 313/321-3552
JOM 420 Commonwealth Drive Warrendale, PA 15086-7511	James Robinson Managing Editor	412/776-9070 412/776-3770
Journal of Coatings Technology 492 Norristown Road Blue Bell, PA 19422-2350	Patricia Viola Editor	215/940-0777 215/940-0292

Journal of Commerce 2 World Trade Center, 27th Fl. New York, NY 10048	Chemicals Editor	**212/837-7000** 212/837-7130
Manufacturing News PO Box 36 Annadale, VA 22003	Richard McCormack Publisher	**703/750-2664** 703/750-0064
Modern Plastics 1221 Avenue of the Americas 43rd Floor New York, NY 10020-1095	Sandy Dylak Managing Editor	**212/512-4616** 212/512-6111
Paper, Film & Foil Converter 29 North Wacker Drive 10th Floor Chicago, IL 60606-3298	Robert Zuck Editor	**312/726-2802** 312/726-2574
PLASPEC PO Box H Yardley, PA 19067	H. Dillon General Manager	**215/428-1060** 215/428-1069
Plastics Brief/Plastics Week 2727 Holland Sylvania Road #A Toledo, OH 43615-1800	Jim Best Editor	**419/535-7899** 419/535-1243

Plastics Business/Canadian Plastics *1803-33 Rosehill Road Toronto CANADA M4T 1G4	Michael Shelley Editor	416/442-2213
Plastics Engineering Magazine 14 Fairfield Drive Brookfield, CT 06804-3911	Roger Ferris Editor	203/775-0471 203/775-8490
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Plastics in Building Construction 851 New Holland Avenue Box 3535 Lancaster, PA 17604-3535	James Harrington Technology Editor	717/291-5609 717/295-4538

Plastics in Canada 406 N. Service Road East Oakville, Ontario, L6H 5R2 CANADA	Larry Bonikowksy Editor & Publisher	905/844-9773 905/844-5672
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Plastics News 1725 Merriman Road Akron, OH 44313 5283	Bob Grace Editor	216/836-9180 216/836-2322
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Purchasing Magazine 275 Washington Street Newton, MA 02158	Kevin R. Fitzgerald Editor	617/964-3030 617/558-4327

Rubber & Plastics News 1725 Merriman Road Suite 300 Akron, OH 44313	Ed Noga Editor	**216/836-9180** **216/836-4616**
Rubber World PO Box 5451 Akron, OH 44334-0451	Don Smith Editor	**216/864-2122** **216/864-5298**
The IAPD Magazine 4707 College Boulevard #105 Leawood, KS 66211-1611	Janet Thill Editor	**913/345-1005** **913/345-1006**
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National School-to-Work Resources

Section II-C:
National Skill Standards and Plastics Certification

- Manufacturing Skill Standards System Development by the National Coalition for Advanced Manufacturing (NACFAM) will serve as a concise overview of this huge project to implement skills standards throughout industry. It answers the questions of **what, why, and how.**

- The NACFAM report, What Manufacturing Workers Need to Know and be Able to Do, outlines the specific skills that have been validated by industry through the development process. These **skills for advanced high performance manufacturing** should be of particular interest to educators. The list suggests that more of these skills could be integrated into existing curricula through a school-to-work focus and application.

- The Skill Standards Based Hiring Process is a flow chart showing how companies can use the standards to assess the skill level of employees and applicants. The five **benefits** listed are directly applicable to the plastics industry.

- The SPI program update, National Employee Certification in Plastics Molding, describes the skills certification process for plastics production workers at four levels. Again, the framework can serve as a **training needs assessment** and for the basis of **curriculum development**. The entire certification process may be complete in late 1997.

- SPE also has a certification effort underway for the Plastics Technologist level. Also included are the 1997 Exam Schedule and Recertification Procedures. A complete **study guide** is available from SPE. Included here are excerpts outlining the Body of Knowledge covered in the exam.

Our vision for a skill standards system:

Data on workplace skill requirements is gathered, validated, benchmarked, and transformed into information which can then be communicated effectively to other stakeholders, and participants in the system. This information is based on the discreet input gathered from currently successful workers in the various occupations.

This information will then be used to develop company specific skill and knowledge profiles. Such a company will then use the information to identify employee skill profiles. By comparing the ideal profile with aggregate employee profiles, both the company and the individual employee will be able to identify the opportunities for employee development which are a hallmark of the high performance workplace.

The resulting information can be used to identify training and other workforce development needs for either current or future workers.

Companies can use skill standards to communicate more effectively to training providers, either internal or external the specific skill employees need to learn. Documentation of skills learned will form a far superior basis for contractual agreements between companies and training providers than current "seat-time" arrangements.

At the community level the aggregate of a number of company specific profiles, undergirded by the national information, will give clear direction to the skills and knowledge individuals should be learning in the community's school systems. Schools can use the information to focus curriculum and design appropriate learning activities. The attainment of skill standards is totally consistent with either a vocational, general, or college track program. By having clear and specific skill standards, schools will be better able to document student achievement.

At the same time students and parents will be able to clearly identify the success of schools by the documentation of specific skills learned by individual students. Aggregate data at the community level will be important to current and future area businesses as the skills available in a community's workforce is an ever more important consideration in a business's decision to located, remain, or expand in a community.

All of the knowledge and lessons learned must be fed back into the ongoing development of the system in order to keep up with global competition and changes in requirements in the workplace.

There is clear evidence that the full development and implementation of such a system will benefit students, adult learners, schools, communities, parents, companies, and communities.

• • • • • •

NACFAM Implementation Scenario at the community level

NACFAM (National Coalition for Advanced Manufacturing) is at the current forefront, and will continue to spearhead the movement towards the full implementation of skill standards based system as the means to identify and specify the skills and knowledge needed by employers and therefore by employees. A skill standards system will help business, education, communities, and most importantly individual people to achieve their goals and desires. The system will therefore identify what people who want to work in the community should learn and know and perhaps most importantly, such a system would provide data about learning that is taking place in a community's schools.

NACFAM has identified the form and content of skill (and knowledge) standards for two occupational areas. This work has been accomplished with the assistance of hundreds of companies, thousands of workers, many communities and numerous schools and colleges. All stakeholders have been involved in the process.

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Future system development work, in addition to the continual development and improvement of skill standard information, will include the development of *tools and methods* to begin the system implementation and use of skill standards information that has been developed. The tools and methods work will begin with the development of company specific skill standards profiles. These company profiles will be based on the nationally developed standards to ensure commonality of language and transportability of information.

At the community level this information, from individual companies, will be aggregated to begin the development of community skill profiles. The company specific, and aggregated community data, can then be used to inform the educational process, students, parents, and community leaders about the general community and company specific needs of employers.

Resulting from this activity will be the guidebooks, tools and methods useful to the broad replication of these process steps.

Companies can use skill standards to communicate more effectively to training providers, either internal or external, the specific skills that either current or future employees need to learn. Schools can use the information to focus curriculum and design appropriate learning activities. The attainment of skill standards is totally consistent with, and can be included in, either a vocational, general, or college track program. By having clear and specific skill standards, schools, and students, will be better able to document student achievement in a form more useful to employers.

Students and parents will be able to clearly identify the success of schools by the documentation of specific skills learned by individual students. Aggregate data at the community level will be important to current and future area businesses, as the skills available in a community's workforce becomes an ever more important consideration in a business's decision to locate, remain, or expand in a community.

The NACFAM work being proposed at this time, will focus on the skill and knowledge needed to be successful in manufacturing and processing companies using advanced technology and processes in a high performance environment.

This work will be accomplished by engaging with specific companies through school or community partners. The skill information developed will be inclusive and will contain skills that may be learned in the K-12 system, in post-secondary colleges and universities, or in the workplace. However, the work will also include the development of systems and tools to enable implementation of the skill standards.

Employers, using their company specific skill profiles, will begin to advertise based on skills and knowledge as an improvement to the current form of most job descriptions and advertisements. Potential applicants can then more easily and accurately compare their own skill profile with a company's current need. This will greatly reduce the cost to employers of screening candidates and assessing skills by temporary work arrangements. It will also reduce the number hires that do not work out because of a different expectations and unfounded assumptions.

Full implementation of such a skill standards based system will help all participants and stakeholders meet their individual goals. Companies will use their measures of cost, quality, and time. Students will see greater job opportunities offering higher wages. Schools will better be able to document the learning they are helping students to accomplish. Communities will see greater economic growth, higher standards living, reduced unemployment, and reduced social costs.

The cost of the work will be supported by a combination of federal funds, funds from companies or on behalf of companies by communities or schools, and in-kind representing the value of company and school personnel involved in the information and system development work.

The benefits will include a company and community specific system framework which can be expanded and improved over time. The project will also result in the development of tools and methods for system development in other communities.

NACFAM
The National Coalition for Advanced Manufacturing

National Skill Standards Project for Advanced High Performance Manufacturing

What manufacturing workers need to know and be able to do...

Introduction

For some time many business leaders have stated the need for more "good workers." They go on to state that *there are good jobs for good workers... if they have the right skills and can apply them to the job*. Skill-based standards will help employers to communicate more clearly and precisely what they mean when they say "good workers." Skill-based standards will help new and current workers as they go through the process of finding a good job; whether it is a first job, a new job, or a better job. And, perhaps most important, skill-based standards will help educators and trainers to align the content and measurement of student learning with the standards of employers.

The need for this kind of information was heard by Congress and the U.S. Departments of Education and Labor. In response, Congress enacted Goals 2000 and School to Work legislation in 1993. In support of that action, the Education and Labor departments funded projects to determine the right kind and level of skills needed by workers in twenty-two different occupational areas. This project is one of the 22 and is focused on manufacturing firms using advanced high performance methods and practices.

Project Overview

The goal of the project is to create a set of workforce "specifications", in the form of skill standards, that clearly describe the skills and knowledge desired by employers for workers in advanced high performance manufacturing. These specifications will help ensure that skill standards provide an effective means for employers to communicate their expectations to students, parents, and educators.

The first phase of the project, which is now complete, determined and validated the skill topics that are most important to employers. The second phase will expand each topic to a full standard. Each skill standard will include the skill, the level of mastery, the conditions within which the skill should be performed, and how the level of mastery will be measured and documented. The information is being validated at each step of the process starting with employers, who are the customers. Educators and others with an interest in this work are also involved in the process.

What is a Skill Standard

Skill standards need to be stated in a consistent framework/format that includes all of the information necessary to form a standard. We have identified the following elements to be part of each skill standard. This is based on considerable work done by other projects and current practice in the education and training community. We have given our best effort to incorporate the needs of the various audiences that will be using the standards: employers, students, teachers, parents, and community representatives.

A standard for a specific skill should contain the following five elements:

1. What is the action (skill)?
2. What are the conditions under which the action is performed?
3. How good is good enough? (criteria/measure)
4. How will the action be measured? (portfolio/test/observation)
5. Why must the action be performed? (rationale)

An example of a skill standard might be:
Working alone with a calculator, add 10 two or three digit numbers five times in three minutes with 100% accuracy, in order to perform necessary calculations for Statistical Process Control (SPC) during the manufacturing process. To be documented by third party or performance assessment.

This example includes:
Action: *add 10 two or three digit numbers*
Conditions: *Working alone with the use of a calculator...five times in three minutes*
How good is good enough: *100% accuracy*
Why: *in order to perform necessary calculations for Statistical Process Control (SPC) during the manufacturing process.*
How is it measured & documented: third party evaluation of performance assessment

How Skill Standards will be Applied

The total list of skill standards developed will be inclusive of many different jobs and employers in advanced high performance manufacturing. It may only take a subset of the skills listed to be able to successfully perform in any one job, or it may take the entire skill set. In either case, there may also be additional job/employer requirements unique to that situation.

By having a comprehensive and standard list of skills from which to select, employers will be able to clearly state their skill and knowledge requirements. This common set of skills, used by many different employers, will make it much easier for students, teachers and others to identify the skill requirements of a specific employer or the common skills required by many different employers in a given area.

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Skills for Advanced High Performance Manufacturing

To date we have developed the skill-based information that follows (which will be continuously improved). The list has been compiled from high-performance manufacturers and educators as competitive challenges have forced those involved to rethink the nature of work. This list has been validated by industry and represents the skills and knowledge that industry needs of its workforce.

You should read each skill on the list as a completion to the statement: "A good competent skilled worker can..."

COMMUNICATION AND TEAMWORK

1 Identify interpersonal characteristics of a team player.
2 Demonstrate the characteristics of a team player.
3 Contrast the role of a team with the role of an individual.
4 Perform techniques used as a team leader.
5 Demonstrate productive relationships within the work group
6 Apply group dynamic principles to manufacturing situations.
7 Identify possible electronic communication uses.
8 Explain the effect of electronic communications versus other communications methods
9 Select appropriate communication methods.
10 List the characteristics of a good group leader.
11 Identify various group processes.
12 Identify components of group dynamics.
13 Demonstrate group leadership.
14 Apply facilitation skills in a group setting.
15 Read process information and follow instructions.
16 Read material and describe concepts.
17 Read documentation, such a computer manual, to determine actions for specific situations.
18 Write the steps of a manufacturing process using sentences and statements as appropriate.
19 Use correct punctuation.
20 Use correct spelling.
21 Write with accuracy, brevity, and clarity.
22 Organize material with a logical flow.
23 Organize and deliver a persuasive oral presentation.
24 Demonstrate good speaking characteristics.
25 Demonstrate appropriate presentation demeanor.
26 Interpret and clarify directions prepared by others.
27 Communicate with customer to establish requirements.

MATH AND MEASUREMENT

1 Add, subtract, multiply, and divide four digit numbers with the use of a calculator.
2 Add, subtract, multiply, and divide four digit numbers without the use of a calculator.
3 Apply basic math functions to solve problems.
4 Create and interpret basic graphs and charts commonly used in manufacturing.
5 Match measurement activities to manufacturing process.
6 Select and use appropriate measurement techniques and instruments.
7 Describe measurements' role in manufacturing.
8 Distinguish between direct and calculated measurements.
9 Compute calculated measurements.
10 Demonstrate proper general measurement techniques.
11 Demonstrate proper precision measurement techniques.
12 Describe the appropriate application and use of precision measurements in manufacturing.
13 Explain calibration requirements of various precision instruments.
14 Illustrate measurement differences when taken with calibrated and non-calibrated instruments.
15 Match appropriate measurement tools with various types of measurement requirements.
16 Demonstrate proper measurement tool usage.
17 State selection criteria for measurement tools.
18 Convert between US and metric measurement systems.
19 Convert fractional measurement to decimal measurement.
20 Compute within measurement systems
21 Document results of measurement activities and calculations.
22 Interpret results of measurements and calculations.
23 List steps with rationale of proper measurement procedures.
24 Distinguish between general and precision measurement.
25 Distinguish between US and metric measurement systems.

WORKPLACE SAFETY AND HEALTH

1 Assume responsibility for the personal safety of self and others.
2 Maintain a clean and safe work environment.

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3 Demonstrate a positive personal attitude towards safety.
4 Comply with established safety practices.
5 Complete forms/paperwork as required.
6 Wear protective safety clothing as required.
7 Maintain and use protective guards and equipment on machinery.
8 Handle/store flammable materials appropriately.
9 Use electrical devices correctly and safely.
10 Prevent spontaneous ignition by practicing proper waste disposal habits.
11 Keep marked aisles clear of equipment and materials.
12 Interpret/display MSDS sheets as required.
13 Identify fire exits and fire-fighting equipment.
14 Report unsafe practices to appropriate personnel.
15 Operate equipment in a safe, prescribed manner.
16 Locate power shutoff controls for all machinery/equipment.
17 Report malfunctions to appropriate personnel.
18 Inspect material/equipment/fixtures for defects.
19 Determine weight/operating limits of equipment.
20 Perform periodic checks during operation to assure proper function.
21 Possess valid first aid card.
22 Determine need for CPR and administer as appropriate.
23 Apply appropriate first aid techniques.
24 Define different types of chemical, biological and physical hazards.
25 Respond to emergencies in the appropriate manner.
26 Describe ergonomics and its importance to the manufacturing process.

PROBLEM SOLVING

1 Explain the value of applying a problem solving system.
2 Apply a system of problem solving.
3 Identify opportunities for applying problem solving techniques.

QUALITY ASSURANCE

1 Contrast quality manufacturing systems with other manufacturing systems.
2 Identify influences of a quality systems on specific manufacturing processes.
3 Explain the effect of quality on profit.
4 Identify the effects of continuous quality improvement.
5 Demonstrate the ability to apply continuous quality improvement to manufacturing processes.
6 Integrate improvement processes.
7 Define SPC.
8 Identify the relationship between SPC steps and specific production processes.
9 Apply SPC to specific production processes.
10 Analyze production specific processes.
11 Analyze and interpret test data for compliance to specifications.
12 Improve production process (if indicated by analysis of data).
13 Maintain production according to instructions.
14 Identify customer problems.
15 Classify customer problems.
16 Determine causes of the problem.
17 Apply problem-solving system.
18 Recommend possible solutions.
19 Develop a plan utilizing a selected quality control system.
20 Evaluate process selected versus desired goals.

BLUEPRINT READING

1 Define basic blueprint terminology.
2 Identify different types of dimensions.
3 Identify general note symbols.
4 Locate notes on a print.
5 Interpret commonly used abbreviations and terminology.
6 Determine tolerances associated with dimensions on a drawing.
7 Determine the tolerance for a reference dimension.
8 Identify types of lines within a drawing.
9 List the essential components found in the title block.
10 List the essential components found in the revision block.
11 Identify orthographic views.
12 Identify isometric views.

13 Identify position of views (top, front, side, and auxiliary).
14 Visualize one or more views from a given view.
15 Determine the scale of the view or section.
17 Check for revisions.

MANUFACTURING FUNDAMENTALS

1 Perform the basic arithmetic functions
2 Use measuring instruments
3 Use hand calculators
4 Calculate with percents, rate, ratio, and proportion with the use of a calculator.
5 Make reasonable estimates of arithmetic results without the use of a calculator.
6 Demonstrate basic mechanical skills.
7 Identify and report equipment malfunctions
8 Follow established safety procedures when around machinery/equipment
9 Describe the importance of correct fixturing and work holding devices.
10 Design and create fixtures or work holding devices.
11 Follow established safety procedures when using machine tool
12 Identify a variety of common machine tools
13 Describe the function of specific machine tools
14 Inspect machine tools for defects
15 Maintain company provided machine tools
16 Locate and retrieve production materials specific to process flow and delivery schedule
17 Receive and communicate process flow instructions and delivery schedules
18 Operate hand tools in a safe, prescribed manner
19 Inspect hand tools for defects
20 Maintain company provided hand tools.
21 Interpret prints to determine appropriate tool usage
22 Follow electrical troubleshooting procedures
24 Identify types of work-saving devices used in manufacturing
25 Describe scenarios in which work-savings devices can be used.

BUSINESS PLANNING AND OPERATION

1 Identify the organizational need for profit.
2 Identify opportunities for profit in manufacturing processes
3 Identify possible barriers to profit in manufacturing processes
4 Identify strategies that may maximize profit potential in manufacturing processes
5 Recognize a business plan that provides for an acceptable profit
6 Identify the components that lead to customer satisfaction
7 Identify possible actions that may lead to customer dissatisfaction
8 Identify the ways that the level of customer satisfaction may affect company success.
9 Explain the importance of a business reputation
10 Identify the ways that customer satisfaction influences a business reputation
11 Identify possible actions that may be used to correct customer dissatisfaction
12 Define a safe work environment
13 Identify immediate and real costs of an accident
14 Identify methods of preventing accidents in the workplace
15 Define the term value added
18 Explain why cost factors are not constant
19 Identify steps within manufacturing processes that determine cost
23 Define the term profit
27 List benefits that are employer paid or provided
28 List benefits that are offered to employees for their optional participation

COMPUTER USE

1 List possible computer applications in manufacturing processes
2 Identify possible effects of introducing computers into manufacturing processes
4 List various methods of tracking inventory quantities
5 List factors that determine inventory demand
8 Demonstrate use of an industry-accepted word processing software package
9 Demonstrate use of an industry-accepted spreadsheet software package
10 Demonstrate use of an industry-accepted database software package
11 Demonstrate use of an industry-accepted statistical processing software package
12 Demonstrate use of an industry-accepted graphic software package

PRODUCT AND PROCESS CONTROL

1 List a variety of process control applications
5 Collect and analyze information to determine and improve work processes
6 Explain the advantages and disadvantages of just in time inventory
7 Create a project plan

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WORKFORCE ISSUES

1 Recognize the difference between a team environment workplace and a conventional workplace
3 Explain how organizational structure affects a manufacturing process.
5 Identify the characteristics of a diverse work force.
9 List steps of a grievance or dispute resolution procedure
12 Identify good personal ethical characteristics and behaviors.
13 Demonstrate good personal ethics.
14 Identify good ethical business behavior.
15 Differentiate between good and poor business ethic practices.
16 Match employee responsibilities to employer expectations.
17 Define discrimination, harassment, and equity.
18 Demonstrate non-discriminatory behavior.

WORKPLACE SKILLS

1 Demonstrate consistently punctual arrival.
2 Document regular attendance.
3 Demonstrate enthusiasm and confidence about work and learning new tasks.
4 Demonstrate safe, careful use, treatment and maintenance of tools, equipment, and machines.
5 Demonstrate appropriate dress and hygiene for successful employment.
6 Demonstrate the ability to act in a polite and respectful way towards co-workers.
7 Demonstrate the ability to complete tasks on time and accurately.
8 Demonstrate the ability to make career decisions.
9 Demonstrate the ability to use labor market information.
10 Prepare a resume and letter of application/interest.
11 Fill out an application for employment.
12 Participate in an employment interview.
13 Follow directions and procedures.
14 Be depended on not to steal equipment and materials.
15 Be truthful in all communications with co-workers and supervisors.
16 Accept constructive criticism.
17 Demonstrate an ability to learn new skills and behaviors.
18 Demonstrate a willingness to work.
19 Demonstrate a willingness to learn.
20 Work with minimal supervision.
21 Plan and organize work.

LEARNING SKILLS

1 Identify personal preferred learning styles.
2 Demonstrate ability to learn new process steps.
3 Implement new process steps given oral instructions.
4 Read process instructions and implement appropriate steps.
5 Participate in product or process specific training and report significant information.

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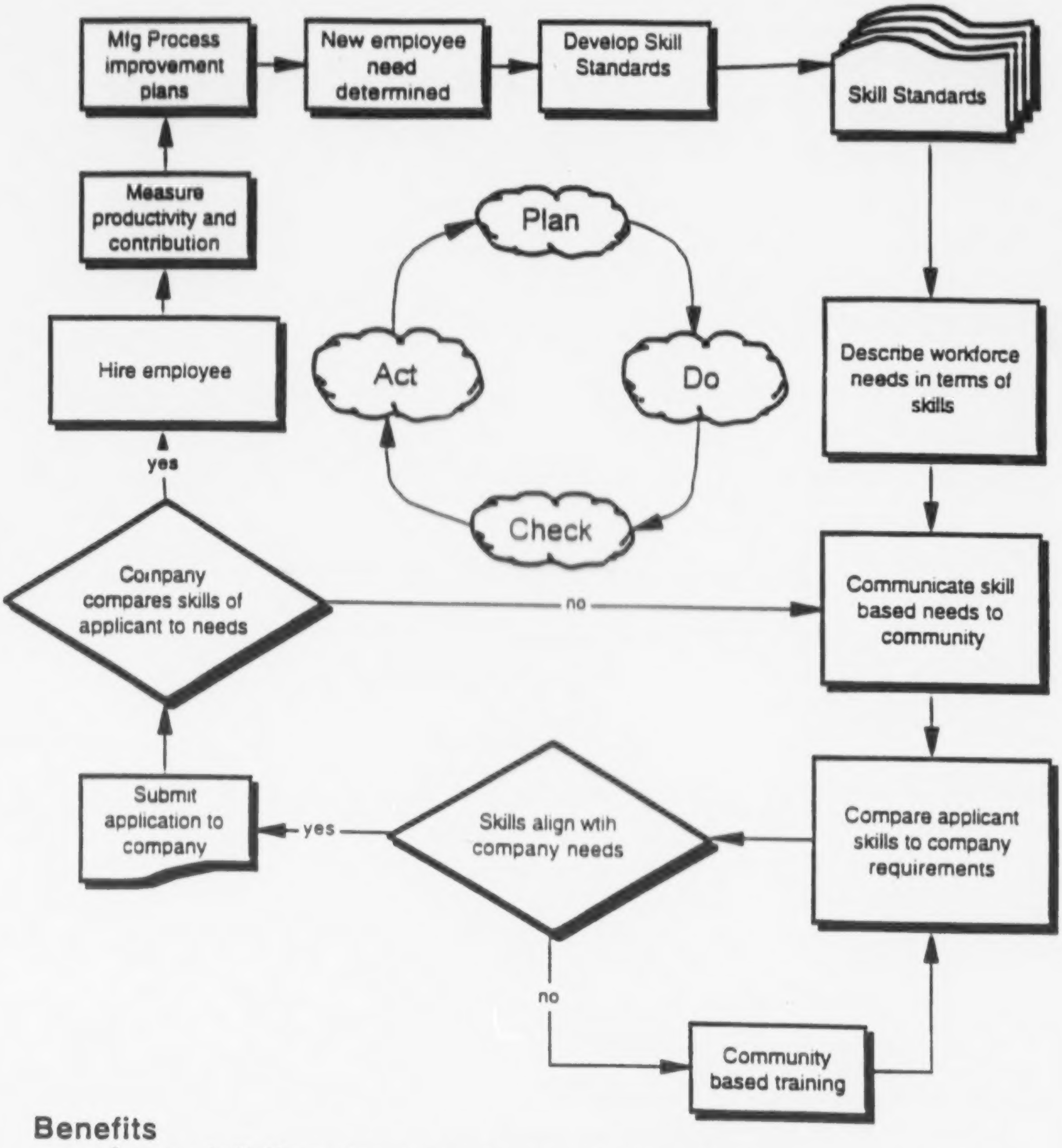
Skill Standards Based Hiring Process


Mfg Process improvement plans
New employee need determined
Develop Skill Standards
Skill Standards
Measure productivity and contribution
Plan
Act
Do
Check
Hire employee
Describe workforce needs in terms of skills
yes
Company compares skills of applicant to needs
no
Communicate skill based needs to community
Submit application to company
yes
Skills align with company needs
Compare applicant skills to company requirements
no
Community based training

Benefits

- Less staff time for interview and selection
- Attract more and more qualified applicants
- Improved productivity due to less OJT
- Better communication to community schools
- More opportunity for individuals

Program Update . . .

nal Employee Certification in Plastics Molding

RESULTS OF PHASE I, LOGICAL ANALYSIS

...Defining the Structure of Injection Molding Jobs

September, 1996

Sponsored by the SPI Molders Division

Excellence in Workforce Development

How To Use This Report . . .

This Status Report is designed to guide you as we develop national skills standards for production employees. It will provide information on how the plastics industry understands the structure of jobs in the injection molding process.

Whether you are a trainer or educator, human resource professional, industry leader, or if you have some other interest in injection molding, this report is for you.

Please feel free to call us at SPI to learn about the National Employee Certification for Plastics Molding program. Or you can request the latest information from our Fax-On-Demand Service by calling (800) 774-4614 and dial extension 6000 for a menu. Information will be faxed to you in moments.

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NOTE: The documentation contained in this Report **does not** *constitute the final task lists to b used for certification examinations. This Report includes preliminary information and is offere for planning purposes only.*

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Why Certification?

In recent years, the plastics industry has experienced dramatic growth, presenting tremendous business opportunities and challenges for plastics molding companies. At the same time, there has been an increasing customer demand for higher quality products, which are produced more economically in order to maintain a high level of competitiveness.

> ***"The greatest benefit . . . would be a program to establish national skills standards . . . and certify employees".***

The key to meeting customers' demands and capitalizing on these opportunities to ensure quality products is an effective, skilled workforce at all levels of production. Injection molding companies, including members of the Society of the Plastics Industry's (SPI) Molders Division, have been hampered, however, by a **growing shortage of experienced production employees.**

A Task Force comprised of members of the Molders Division was formed to evaluate the workforce issues in depth and explore various solutions. SPI and its member companies provided substantial support for these initial efforts, through both human and financial resources. During 1992, 1993, and early 1994, Molders Division personnel and the Task Force worked to identify key problems facing plastics molders. They concluded that the greatest benefit to the molding industry as a whole would be a program to establish **national skills standards** for manufacturing employees and to **certify employees** according to those standards.

Following an extensive review, the Molders Division contracted with a leading testing organization, CTB/McGraw-Hill, to conduct research, develop, and implement the **National Employee Certification for Plastics Molding Program (NECPM).** The industry-wide program is designed to:

- Identify the job-related skills and knowledge essential to superior job performance at every level in the manufacturing process
- Advocate national skills standards for each job function
- Test for and certify employee knowledge and skills.

— from the NECPM Mission Statement

Who Wants It?

Early in 1995, CTB/McGraw-Hill directed a comprehensive needs assessment throughout the plastics injection molding industry, including focus groups, in-depth individual interviews, and a formal market survey sent to 4500 injection molders in the U.S. The response to the survey was well above the generally-accepted norm for market research of its kind, giving a clear indication that the industry is interested and believes in the value of an employee certification program. More than 80% of all companies who responded to the survey expect to use NECPM for their employees. They said, "The sooner, the better!"

> ***". . . clear indication that the industry is interested and believes in the value of an employee certification program".***

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The respondents considered national standardized skill levels important and identified the following significant benefits which could result from an employee certification program:

- Marked increase in employee productivity
- Improved employee morale and professionalism
- Greater confidence in measuring production employees' skills
- Consistency in employee performance standards
- Enhancement of a company's competitive image

> ***"a nationwide voluntary program to measure skills"***

How Will It Be Done?

The National Employee Certification Program for Plastics Molding (NECPM) will be a nationwide, voluntary program to measure the skills of production manufacturing employees against national skills standards. Each employee who demonstrates the knowledge and skills required to perform each task on the job floor by passing the designated examination will be certified in the appropriate job category.

Development of NECPM will include four major phases, each validated by industry experts:

I. **Logical Analysis,** analyzing the structure and relationship of all production injection molding jobs. This process results in clearly defined job categories, typical task lists for each job category, and preliminary "Content Framework."

II. **Job Analysis,** studying each job level and identifying in detail the work performed on the job.

III. **Test Development,** linking the tasks performed to knowledge, skills, and abilities required. Test items will be constructed to measure what is required on the job.

IV. **Certification Exams,** establishing a measurable standard and creating industry-wide consistency in job requirements. The exams will also provide a method for evaluating training effectiveness.

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Phase I: Logical Analysis

What Is Logical Analysis?

One of the most important steps in the development of skill standards for an effective certification program in injection molding is the Logical Analysis, which defines the logical structure of job levels within the injection molding process. It provides the foundation on which the certification program is built. Logical Analysis activities were directed by CTB/McGraw-Hill during the months of April through July 1996.

The injection molding process was divided into four job levels as a result of the Logical Analysis. An outline of the work content categories was prepared, encompassing the general work requirements for each job level. Afterwards, preliminary lists of work or tasks performed and job skills required for injection molding were developed, including those skills and tasks common to all levels of jobs and those which relate to specific levels. The information gathered was reviewed and validated by a Work Group of members from a wide cross-section of the industry, who also recommended **two levels for initial certification**.

> ***"The results of the Logical Analysis may also be used as a basic . . . frame work for developing training . . ."***

The documentation from the Logical Analysis may also be used as a basic content framework for the development of training curricula for all four levels of injection molding jobs. It should be noted that work categories and task lists defined during Logical Analysis will be further refined and may be modified during the next phases of certification program development.

The general descriptions of job levels and work categories defined during the Logical Analysis form the starting point for the next phases, detailed analysis of each job level (Job Analysis) and certification test development.

What Information Was Gathered?

The Logical Analysis consisted of several activities designed to provide comprehensive, accurate information about the work performed throughout the injection molding process. CTB/McGraw-Hill conducted extensive industry research of documentation and both on-site and telephone interviews in order to collect information on the following topics:

- Description of tasks performed for a specific job
- Knowledge required to perform different levels of jobs
- Production profile of the company
- Interrelationships between jobs
- Company's typical career path

A list of all companies participating in the Logical Analysis process is found in Attachment II to this document.

CTB/McGraw Hill's steps to gather information were:

1. Industry research, including a **thorough evaluation of available documentation** regarding the plastics industry in general and all injection molding jobs, including such documents as organization charts; job descriptions; information on training, apprenticeships, and internship programs; and, trade publications.

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2. CTB/McGraw-Hill project staff conducted **on-site interviews** to gather information on injection molding processes and settings in which molders operate. Each visit included a tour of the operation(s), individual interviews with workers representing all areas of the injection molding production process, and meetings with human resource managers, plant managers, and executive management.

3. **Telephone interviews** were conducted with 36 production employees, including those holding group and shift support, material handling, mold/die setting, operations specialist, operator, process/mold technician, production manager, production planner and control, and quality control positions.

A profile of companies interviewed is found as Attachment I to this document, providing summary information in the following categories:

- Products
- Number of injection molding machines
- Machine specifications
- Percentage of machines running automatic mode
- Quality assurance documentation
- Use of technology
- Interviewed employees' experience in plastics industry
- Number of machines for which a production employee is responsible
- Average frequency of mold changes
- Typical duration of mold change

Interviews indicated that progression from one job to another in injection molding seems to be based on job performance (quality and quantity), on specific knowledge an individual acquires, and on "soft work skills" such as initiative, work ethic, and attitude.

How Was the Research Validated?

A Logical Analysis Work Group was formed, with the mission to review the information gathered by CTB/McGraw-Hill and validate the findings, focusing on the following areas:

- Levels of injection molding jobs
- Areas of work or responsibility for injection molding job levels
- Selection of two levels for in-depth Job Analysis and certification
- Definition of the specific work performed at the two job levels

The Work Group was comprised of nine members chosen for their broad knowledge of injection molding job responsibilities and diverse backgrounds, representing different market types, job levels, and areas of experience. The group offered a wide range of experience in the different jobs in injection molding, including:

- Operator
- Material handler
- Mold set up
- Process technician
- Quality control
- Training
- Human resources
- Supervision

The participants' companies represent diverse businesses, custom and proprietary, union and non-union, small and large, various levels of quality assurance requirements, varying degrees of automation, and such markets as:

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- Automotive parts and accessories
- Consumer & Industrial Products
- Health care
- Lawn furniture
- Small appliances
- Tools
- Toys

What Were the Conclusions?

Upon careful review of all production jobs in an injection molding plant identified during the Logical Analysis, the Work Group organized work performed into two distinct categories: those tasks directly involved in the injection molding process and those providing peripheral support to the injection molding process. These four job levels which encompass the injection molding process were defined:

[Note: The titles listed below are intended to be descriptive, but are not to be considered final job titles.]

Production Level A (Machine Attending) — attend molding machine, inspect (visual and dimensional) and chart, finish, assemble, and pack product.

Production Level B (Material Handling) — supply necessary materials and equipment to the manufacturing floor, move product to the warehouse, trouble shoot material-related auxiliary equipment.

Production Level C (Mold Set Up) — install or remove mold and auxiliary equipment, set machine parameters as per given specifications, and test set up.

Production Level D (Process Technician) — apply process and technical knowledge at new job start up and while trouble shooting existing jobs to produce quality and cost-effective products.

Each job level is further defined by major "categories of work," with individual tasks listed by work category. The following categories of work or responsibilities for injection molding job levels were defined and validated:

- Production
- Machine maintenance
- Quality control/assurance
- Safety
- Read and understand
- Communication

The Preliminary Task List and Content Framework was created for each of the four job levels, and can be found as Attachment III. SPI encourages all organizations involved in training and managing injection molding employees to use this work as a preliminary content outline when developing and/or refining training programs.

Please note that both categories and tasks are subject to modification during Job Analysis and Test Development phases of program development.

Which Job Levels Were Selected for Initial Certification?

Skills standards and certification testing will be offered initially in two of the four job levels: Level A (Machine Attending) and Level D (Process Technician). Levels A and D were chosen for initial certification because they represent the largest

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number of production employees, the most immediate benefits to the industry, and the greatest potential effect on product quality. Levels B and C will be addressed in a future phase of certification development.

What Are the Next Steps?

The documentation of job levels, categories of work, and content framework (preliminary task lists) will form the basis for the subsequent steps in certification development, Job Analysis (Phase II) and Test Development (Phases III and IV).

Phase II, Job Analysis, will include an in-depth review of job levels and work requirements designed to produce definitive skills standards, including concrete task lists for each level, and documented knowledge, skills, and abilities necessary for successful and competent practice in job levels A and D. In addition, tasks will be ranked in importance relative to optimum job performance. Content framework for curriculum development will also be finalized.

Attachments:

I. Profile of Companies Interviewed
II. Companies Participating in Logical Analysis
III. Task List and Content Framework (Preliminary)

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PROFILE OF COMPANIES INTERVIEWED FOR SPI BY CTB/MCGRAW-HILL

(Attachment I to "NECPM Update — Results of Phase I, Logical Analysis
...Defining the Structure of Injection Molding Jobs)

Products:	Range of products: Small appliances and tools, health care products, automobile and tractor parts and accessories, lawn furinture, toys, multi-part products assembled and packaged. Number of products: 2 to 1,000
Number of Injection Molding Machines:	Smallest: 6 Largest: 300
Machine Specifications:	250 - 3000 ton clampage 1.5 oz. - 165 oz. shot
Percentage of Machines Running in Automatic Mode:	Least automated: 25% of machines run auto Most automated: 100% of machines run auto
Quality Assurance Documentation:	Ranging from minimal to highly specified company processes to mandated level of control (e.g., ISO 9000 or FDA regulations).
Use of Technology:	Minimal Computers monitor cycle and count product. Technologically advanced - Disks store machine parameters for molds. - Computers control fill and recovery time to within 0.01 sec's. - Program Logic Control (robots and air sequence box ejector) - Robots operate machines and trim product. - Computers take and record part measurements (e.g., wieght) to ensure every product is within tolerance.
Interviewed Employees' Experience in Plastics Industry:	Operators: 6 months - 18 years Material Handlers: 2 - 6 years Mold Set Up: 2 - 19 years Technicians: 1 - 36 years QC Inspectors: 3 - 11 years Other: 7 - 38 years
Number of Machines for which a Production Employee is Responsible:	Variation among operators due to degree of machine automation and degree of molded product trimming or other finishing needed. Operators: 1 - 3 machines Material Handlers: 7 - 19 machines Mold Setters, Techs: 7 - 19 machines
Average Frequency of Mold Changes:	Great variation depending on products being molded, production schedules. One to seven changes per shift, to one to two days per machine, though can run same mold for 3-5 months.
Typical Duration of Mold Change:	Great variation depending on mold size. Ranges from 1 - 8 hours, with average being 2-4 hours.

This attachment supports the "NECPM Update ...Defining the Structure of Injection Molding Jobs", issued September, 1996. It is not intended for any other use.

Attachment I

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COMPANIES PARTICIPATING IN LOGICAL ANALYSIS

(Attachment II to "NECPM Update — Results of Phase I, Logical Analysis
...Defining the Structure of Injection Molding Jobs)

- Automatic Technologies, Inc.
- Bemis Manufacturing, Inc.
- Blue Water Plastics, Inc.
- Cowan Plastic Products Corp.
- DeRoyal Plastics Group
- Dickten & Masch Manufacturing Co.
- Diemolding Corp.
- Huron Plastics Group, Inc.
- Jatco, Inc.
- Landis Plastics, Inc.
- Michigan Plastic Products Company
- NYPRO
- Pacific Plastics & Engineering
- Packard Electric
- Plastocon, Inc.
- United Southern Industries, Inc.
- Vaupell Industrial Plastics, Inc.

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JOB TASKS AND TRAINING CONTENT FRAMEWORK (PRELIMINARY)

(Attachment III to "NECPM Update — Results of Phase I, Logical Analysis ...Defining the Structure of Injection Molding Jobs)

Injection Molding Process — **Job Levels**

		A	B	C	D
A	**PRODUCTION**	X	X	X	X
A1	**Handle raw materials**	X	X	X	X
A1a	- Mix according to directions	X	X	X	
A1b	- Keep machines supplied		X		
A1c	- Sort/repackage unused production materials	X	X		
A2	**Regrind scrap plastic**	X	X		
A3	**Run machines to mold product**	X	X		
A3a	- Operate a variety of automatic or semiautomatic injection molding machines	X			
A3b	- Add any necessary inserts (e.g., yo-yo center rod)	X			
A3c	- Remove molded parts	X			
A3d	- Ensure mold is clean and clear for next cycle	X			
A3e	- Load/unload production parts onto/from a conveyor system	X	X		
A4	**Package product**	X	X		
A4a	- Bag or wrap product as per packaging instructions	X			
A4b	- Enclose insert (e.g., instruction sheet, pamphlet)	X			
A4c	- Place product in fixtures or container	X			
A4d	- Verify part/piece count	X	X		
A4e	- Use scales to weigh boxes	X	X		
A4f	- Make and label cartons	X	X		
A4g	- Wrap skids and pallets	X	X		
A4h	- Move all in-processed and finished goods to designated areas during and at the end of shift (e.g., clean rooms)	X	X		
A5	**Perform other in-process operations**	X			
A5b	- trimming, filing, cutting, hot stamping, sonic welding imprinting, CABL labelling (bar code)	X			
A6	**Finish/Assemble components**	X			
A6a	- Combine molded components with molded product into sub-assemblies	X			
A6b	- Use small hand tools on piece parts or assemblies	X			
A7	**Material inventory**	X	X	X	X
A7a	- Coordinate material moves [(resin, plastic parts, component parts, packaging materials) to and from storage areas/plant production area, tagging material and supplies properly]		X		
A7b	- Determine action on possible contaminated materials	X	X	X	X
A7c	- Run material evaluations			X	X
A7d	- Ensure supplies adequate to meet production needs		X		
A8	**Clean resin hoppers, grinders, and material boxes (or vacuum tubes) thoroughly before making color changes**		X		
A9	**Monitor injection molding machinery and process**	X	X	X	X
A9a	- Perform material moisture checks			X	X
A9b	- Detect and report nonconforming conditions	X	X	X	X
A9c	- Assist in resolving minor production-related problems	X	X	X	X
A9d	- Ensure proper drying conditions		X		
A10	**Change molds**		X	X	X
A10a	- Identify mold components using proper terminology			X	X

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		A	B	C	D
A10b	- Clean and lubricate molds; apply rust inhibitor			X	X
A10c	- Use hand tools		X	X	
A10d	- Ensure proper functioning (e.g., check heating and cooling systems)		X	X	
A10e	- Set machine parameters		X	X	
A10f	- Use computer system to recall electronically stored parameters		X	X	
A10g	- Hang and clamp molds		X	X	
A10h	- Understand operating controls		X	X	
A10i	- Perform dry test run on machine		X		
A10j	- Place related equipment (e.g., chutes, conveyors, etc.) into position	X	X		
A10k	- Adjust robot controls		X	X	
A10l	- Prep and store mold		X	X	
A11	**Setup secondary operations (e.g.,sonic welding, stamping or decorating, drilling or milling of part) and document procedures**	X	X		
A12	**Maintain manufacturing process**		X	X	
A12a	- Start production run and inspect first part for conformance to specifications		X		
A12b	- Perform trial run and inspect first part for conformance to specifications			X	
A14	**Utilize computer systems**	X	X	X	X
A14a	- Understand and operate computer equipment	X	X	X	X
A14b	- Setup control of auxiliary equipment: robots and air sequence ejector				X
A14d	- Read printout/display to determine mold set-up or process problem			X	X
A14f	- Utilize computer system to enter and recall SPC data	X		X	X
A14g	- Utilize computer system to enter production data	X			
A14h	- Maintain process sheet file/bank				X
A15	**Isolate problem areas; suggest corrections**	X	X	X	X
A17	**Monitor and adjust production processes to identify need for improvements:**			X	X
A17a	- to job efficiency, to uptime efficiency			X	X
A17b	- to reduce production costs			X	X
A18	**Assist in new product development**			X	X
A18a	- Help develop and refine commercial requirements				X
A18b	- Help identify best material, considering any special product needs (e.g., ability to withstand high heat)				X
A18c	- Qualify mold			X	X
A18d	- Establish set up information				X
A18e	- Suggest process or hardware changes (e.g., flow rate, cavity shape, or size)			X	X
A19	**Shut down/start up plant**	X	X	X	X
B	**MACHINE MAINTENANCE**	X	X	X	X
B3	**Troubleshoot equipment and perform necessary repairs or adjustments on water and material systems**		X	X	X
B3a	- water temperature controllers/chillers			X	X
B3c	- material vacuum pumps and lines		X	X	X
B3d	- minor repairs: fix oil leaks, broken wires			X	X
B3e	- electrical equipment			X	X
B3f	- hydraulic equipment			X	X
B3g	- pneumatic equipment				X
B4	**Requisition parts**		X	X	X
B5	**In press mold changes, including inserts and date code changes**				X
B8	**Make periodic inspections of plant and processing equipment to detect evidence of malfunctioning and potential breakdown**		X	X	X
B9	**Request repair work to be done by other plant personnel or vendors**	X	X	X	X
C	**QUALITY CONTROL/ASSURANCE**	X	X	X	X
C1	**Conduct [in-process and final] inspections**	X	X	X	X
C1a	- visual	X	X	X	X
C1b	- dimensional	X	X	X	X

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		A	B	C	D
C1c	- check fit of mating parts	X			X
C1d	- other: using spectrocheck, scales	X	X	X	X
C1e	- use digital instruments at remote data collector	X			X
C2	**Compare and evaluate product samples -first shot/last shot**	X			X
C2a	- Obtain and label first and last shot	X			
C3	**Classify non-conforming product**	X	X		
C3a	- Isolate defective parts	X	X		X
C3b	- Sort parts for rework	X			
C3c	- Determine root cause of non-conforming parts				X
C4	**Ensure correct labeling and packaging of product**	X	X		
C5	**Assist in resolving quality issues**	X	X	X	X
C5a	- Make QC decisions within parameters	X	X		
C5b	- Make QC decisions about parameters			X	X
C8	**Verify that parameters are correctly set for automatic sorting equipment**				X
C10	**Identify improvements to product quality**	X	X	X	X
E	**READ AND UNDERSTAND**	X	X	X	X
E1	**- Quality Acceptance and Rejection Standards (per industry guidelines)**	X			
E2	**- Operator Instructions (for running machines)**	X			
E3	**- Rework instructions**	X	X		
E4	**- Safety regulations**	X	X	X	X
E5	**- Emergency procedures**	X	X	X	X
E6	**- Detail and mold prints**			X	X
E7	**- Comprehend relationship of job task to company profit**	X	X	X	X
F	**RECORD KEEPING/ REPORTING**	X			X
F1	**Maintain production records**	X			X
F1a	- Record cycles	X			X
F1b	- Record number of good parts	X			X
F1c	- Record number and type of defective or impounded parts produced	X			X
F1d	- Record machine down time and reason why	X			X
F1e	- Complete Machine Utilization Report	X			X
F3	**Input production sheet data into electronic system**				X
F4	**Chart product defects, maintain statistical control charts**	X			X
F6	**Inventory raw materials, components, and packaging items**		X		
F10	**Document process changes**				X
G	**COMMUNICATION**	X	X	X	X
G1	**Between colleagues at shift changes and breaks**	X	X	X	X
G3	**With Quality Department personnel**	X	X	X	X
G4	**With supervisor/production leader regarding schedule and production needs**	X	X	X	X
G5	**To provide information instructions on the manufacturing process**	X	X	X	X
G6	**Communicate with colleagues to identify solutions to problems**	X	X	X	X
H	**SAFETY**	X	X	X	X
H1	**Understand terminology and symbols (e.g., hazardous materials, safe handling, clean-up, storage and disposal of hazardous materials (e.g., biological clean-up), etc.**	X	X	X	X
H2	**Check mechanical safety controls**	X	X	X	X
H3	**Check hydrolic safety controls**	X	X	X	X
H4	**Follow lock-out control procedures for mechanical, electrical, hydrolic**	X	X	X	X
H5	**Ensure safe and proper use of equipment and tools**	X	X	X	X
H6	**Ensure safe and proper use of personal protective equipment**	X	X	X	X
H7	**Maintain a clean and safe environment**	X	X	X	X

This attachment supports the "NECPM Update ...Defining the Structure of Injection Molding Jobs", issued September, 1996. It is not intended for any other use

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PLASTICS TECHNOLOGIST CERTIFICATION PROGRAM and RECERTIFICATION PROCESS ...

INSTITUTE for PLASTICS CERTIFICATION ANNOUNCES 1997 ROLL-OUT

SPE successfully launched its *Plastics Technologist Certification Program* at ANTEC '96 in Indianapolis! To expand the exams nation wide in 1997, test centers and time frames have been selected. The National Institute for Certification of Engineering Technologies (NICET) will administer the exams. Since the *Plastics Technologist Certification Program* has been so well received, IPC/SPE is designing and developing *Specialty Exams for Plastics Engineers*. Two Specialty Exams are slated for implementation at ANTEC '98 in Atlanta.

What is Certification?

Certification is the formal recognition by a cognizant peer group that an applicant has demonstrated - through examination and submission of qualifications - comprehension of and proficiency in a uniquely defined body of knowledge. The certification process also provides for an individual's continued professional growth through recertification.

Certification should not be confused with licensing, a process that each state uses to grant licenses to engineers to permit them to practice in that state. Nor should it be confused with accreditation, which is a form of 'vouching for' in some official capacity. Accreditation is similar to certification but pertains to a program or institution rather than an individual (e.g. ABET accredits plastics engineering programs).

What is the purpose of Certification?

The purpose of the Plastics Technologist Certification Program is to recognize and document the skills and competencies of individuals in the area of plastics technology. Perhaps the most important aspect of SPE's certification program is the recertification component. Participation in professional development and continuing education activities keeps individuals informed of the rapidly changing state-of-the-art technologies in the plastics industry.

What does Certification mean for the individual?

Certification has many benefits, including:

- It identifies practitioners who have achieved a specific level of knowledge, skills, and competencies, and provides documentation of their achievement to customers, employers and colleagues.
- It adds credibility and stature to the profession.
- It gives practitioners incentive to increase their competence and continue their education.
- It can help increase the self-esteem of certified practitioners and their sense of identification with the certified group.
- It encourages practitioners to keep pace with state-of-the-art technology by enhancing their skills and knowledge.

How does an individual become Certified?

Certification is earned by: 1) Successfully completing the Plastics Technologist exam, and 2) Attaining a combination of six *experience credits*. *Experience credits* are the accumulation of a) years worked as a plastics technologist or similar plastics related work (1 year = 1 *experience credit*), and/or b) highest education level earned in engineering or related field (Assoc. Degree = 2 *experience credits*, Bachelors Degree or higher = 4 *experience credits*). Certification will be awarded to those who meet the above criterion and is granted for a period of three years .... while transitioning to the Recertification Process.

What is the Recertification Process?

The *Recertification Process* is an on-going professional growth effort which encompasses the three year certification period.

Once certified, the practitioner must choose one of two methods for *Recertification*: 1) accumulate 36 *credits* through participation in professional development activities during the three year period or, 2) retake the examination after the three year period. *Recertification credits* are earned via participation in: SPE Society Sponsored National, Regional, Sectional or Divisional Education Activities, Corporate Instruction, Adult Education Courses, Home Study, Presentations and Papers, Part-Time Teaching, Patents, Corporate Presentations and other committee approved special activities.

A Recertification Credit Journal will be forwarded to each certified technologist for record keeping. The journal contains instructions and tear-out activity forms for proper professional development credit validation. An annual fee of $25 will be charged by IPC/SPE to cover recording and administrative costs of the recertification program.

How does the Certification Program and Recertification Process benefit a company?

- It encourages employees to review concepts and fundamentals that transcend their everyday work experience.
- It encourages an employee to actively support and attend in-house training programs.
- Recertification requirements ensure active participation in seminars, workshops, RETECs and ANTECs.
- Formal credentials and recognition within the industry can boost self-esteem and increase morale.
- Companies enhance their competitive position and credibility when their employees attain certification.

To request applications and further information, fax your name and address to: Nancy Herdegen, SPE/IPC Headquarters, 14 Fairfield Avenue, Brookfield, CT 06804, fax (203)775-8490 ... or phone (203) 775-0471.

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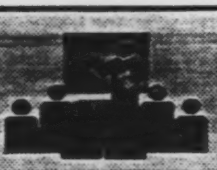

1997 PLASTICS TECHNOLOGIST CERTIFICATION EXAM SCHEDULE

Institute for Plastics Certification ..... Society of Plastics Engineers

The IPC 1997 PLASTICS TECHNOLOGIST CERTIFICATION exam schedule is listed below. To request information packets which include study guides, recertification information and applications, fax your name and address to: Nancy Herdegen, SPE (IPC), 14 Fairfield Drive, Brookfield, CT 06804, fax (203) 775-8490 ... or call (203) 775-0471. Applications postmark deadlines: Cycle 1 = 12/7/96; Cycle 2 = March 6; Cycle 3 = May 21. Exam Cost: $125 SPE Member .... $175 Non-Member

Test Center Codes	Test Center	Time Frame 1997		
		Cycle 1	Cycle 2	Cycle 3
	California			
CA3	College of San Mateo	Feb 1		
CA2	CA State Univ., Los Angeles	Feb 15 & Mar 1		
ANTEC '97	**Canada, Toronto** (*Review Course given*)		Week of April 27	
	Connecticut			
CT2	University of Hartford		May 17	
	Georgia			
GA1	Southern College of Tech., Marietta	Feb 1		
	Indiana			
IN2	Indiana-Purdue Univ., Indianapolis			Aug 16
IN3	Purdue Univ., Calumet, Hammond			July 26
	Massachusetts			
MA1	Northeastern Univ., Boston		June 7	
	Michigan			
MI5	Macomb Comm. Col., Warren			Aug 30
	Minnesota			
MN2	Dunwoody Institute, Minneapolis		May 3	
	Nebraska			
NE2	Univ. of Nebraska, Omaha			Aug 16
	New Jersey			
NJ70	New Jersey Inst. of Tech., Newark			July 26
	North Carolina			
NC1	Cent. Piedmont Comm Col., Charlotte			July 26
	Ohio			
OH1	Col. of Appl. Sci., Univ. of Cincinnati			Aug 16
OH2	Cuyahoga Comm. College, Cleveland		May 17	
	Oregon			
OR1	Portland Comm. College		May 3	
	Pennsylvania			
PA5	Harrisburg Area Comm. College		May 3	
	Tennessee			
TN4	Nashville State Tech. Institute	Feb 15		
	Texas			
TX2	Houston Community College	Feb 15		
TX5	Assoc. General Contractors, Dallas	March 1		
	Virginia			
VA1	John Tyler Comm. College, Chester		May 10	

RECERTIFICATION PROCEDURES

INTRODUCTION

This professional development policy reflects the position that there are continual and significant changes in plastics technology which preclude passing one exam at a particular point in time and claiming competence forever after. Today, with certification being used as evidence that an individual has acquired a particular level of competence and knowledge, recertification is the method of choice to periodically re-confirm that competence and knowledge.

METHODOLOGY

A certified individual has two paths to maintain his/her certification: (1) participate in continuing education activities or (2) re-take the examination. If option (1) is chosen, an individual must complete a minimum of 36 professional development recertification credits. It will be that person's responsibility to keep up-to-date the record of his/her continuing education activities.

The Recertification Committee reserves the right to ask for validation of any particular continuing education activity.

The Recertification Committee has determined the following categories for acquiring professional development recertification credits:

1. SPE (or related) Society Sponsored National, Regional, Sectional, or Divisional Education Activities

One (1) recertification credit will be awarded for each hour of attendance at conferences, seminars, workshops, symposia, forum, technical sessions, etc. One (1) recertification credit will be awarded for attending each exposition, plant tour, Section or Division meeting that has a technical presentation associated with it.
NOTE: You must earn at least twelve (12) recertification credits from the above.

2. Adult Education Courses

Management - or engineering - related courses taken from colleges, universities, and technical schools are worth five (5) recertification credits for each semester credit hour and three (3) recertification credits for each quarter credit hour. An acceptable passing grade of at least a C must be attained.

3. Corporate Instruction

Management - or engineering - related training offered through one's employer will be awarded one (1) recertification credit for each hour of attendance.

4. Home Study

Recognized correspondence courses in engineering or management resulting in a certificate of completion will be worth one (1) recertification credit for each recommended hour of study to complete the program.

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5. Presentations and Papers

Five (5) recertification credits are awarded for each engineering - or management - related paper published by a recognized publisher. Three (3) recertification credits are awarded for each management or engineering technical presentation given to SPE Sections, Divisions, other related societies or colleges and universities.

6. Part-Time Teaching

Teaching management - or engineering - related courses at colleges, universities, and technical schools are worth five (5) recertification credits for each semester credit hour and three (3) recertification credits for each quarter credit hour. You must have a full-time position other than teaching.

7. Patents

Five (5) recertification credits will be awarded for each patentable work when the patent has been applied for or is pending.

8. Corporate Presentation

Major presentations to management (e.g., projects relating to product improvement, new products, cost cutting measures, etc.) may be credited. Details of the project must be submitted to the Committee along with signature of your supervisor. The number of credits will be determined by the Committee after review of the breadth and depth of the project.

9. Other Activities

Additional activities relating to the fields of engineering or management not covered by the previously stated categories may be awarded recertification credits at the discretion of the Recertification Committee of the Institute of Plastics Certification, SPE.

Once a certified individual reaches the age of 60, requirements for recertifcation and associated fees are waived.

Study Guide for the
Plastics Technologist
Certification Examination

Society of Plastics Engineers, Inc.
14 Fairfield Drive
Brookfield, Connecticut 06804-0403
(203) 775-0471

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BODY OF KNOWLEDGE

SECTION I: FUNDAMENTALS

- MATHEMATICS
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  - Trigonometry
    - Functions and Graphs
    - Equations
  - Analytical Geometry
    - Graphs and Functions
    - Coordinate Systems
  - Calculus

- STATISTICS
    - Collection of Information and Analysis
    - Numerical Summaries
    - Graphical Summaries
    - Comparison of Data Sets
  - Probability Model
  - Statistical Quality Control Methods
    - Control Charts
    - Acceptance Sampling
    - Goodness-of-fit Tests

- PHYSICS
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    - Forces and Moments
    - Equilibrium
  - Dynamics
  - Mechanics of Materials
    - Stress and Strain
    - Beams
  - Thermodynamics
    - Density, Pressure and Temperature
    - Laws of Thermodynamics
  - Fluid Mechanics

- PLASTICS CHEMISTRY
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    - Definition of Plastics
    - General Categories of Plastics
  - Physical Chemistry of Plastics
    - Atomic Weight and Number
    - Molecules
  - Bonding Forces
    - Primary Bonds
    - Secondary Bonding Forces
  - Molecular Construction
  - Polymerization
    - Addition Polymerization
    - Condensation Polymerization
  - Combination of Plastics
    - Copolymerization
    - Terpolymerization
    - Alloys and Blends
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    - Branched
    - Linear
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    - Crystalline Polymers
    - Liquid Crystal Polymers
    - Polymers Based on the Ethylene Chain
  - Polymers With Oxygen in the Chain
  - Carbon "Backbone" Polymers
  - Polymers With Nitrogen in the Chain
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- COMMUNICATIONS
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    - Blue Print Reading
    - Engineering Geometry
    - Orthographic Projection
    - Computer Aided Drafting and Design
  - Computer Hardware
    - PCs
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    - Geometric Tolerancing
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  - Molding Specimens
  - Cutting From Sheet
  - Machining From Sheet and From Finished Products
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- Thermal and Flow Characteristics
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  - Vicat Softening Point
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  - Temperature Controllers
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  - Moisture
  - Temperatures
  - Particle Size
  - Feed Throat Temperature
  - Hydraulics Temperature
  - Proper Heat Profiles
  - Proper Warm-Up
  - Purging
- Safety Considerations

National School-to-Work Resources

Section II-D:
Information From Other States

- WASHINGTON: the Manufacturing Technology Advisory Group has published a set of **core competencies and performance objectives** for manufacturing, many of which are applicable to the plastics industry and can be used to evaluate current curriculum. Included here are the table of 10 sections and the complete list for the first section on Group Dynamics and Communication. **This tech prep** curriculum leads to an Associates Degree in Manufacturing Technology which a high school student could complete in just over one year of college. The MTAG also publishes a How- to Guide for Manufacturers to support the school-to-work program.

- MASSACHUSETTS: the Berkshire Plastics Network is a business consortium for small to mid size plastics companies and tool shops which, among other things, supports a **moldmaker apprenticeship** program. In the four fact sheets note the emphasis on active **alliances with educators.**

- WISCONSIN: the Manufacturing Plastics Youth Apprenticeship Program combines traditional academics and manufacturing skills for high school students. Their Occupational Cluster Analysis for plastics is also included, but curriculum information was not available.

- INDIANA: the Essential Skills and Technical Proficiencies for **plastics occupations** includes task lists for seven levels of plastics workers. In addition to technical skills, the report also has an excellent description of Personal Qualities and Essential Skills as identified by **SCANS**, the Secretary's Commission on Achieving Necessary Skills. Again, these skills can be used by industry-education partners to design and evaluate curriculum.

- OHIO: the Plastics Technical Competency Profile by Ohio State University used representatives from industry and education to identify occupational, academic, and employability competencies. Included here are the Plastics Jobs Definitions and the 10-page Index.

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Manufacturing Technology Advisory Group - MTAG

MTAG is a Washington State sanctioned committee comprised of representatives from industry, labor, education, State government, and community service organizations. MTAG is chartered to develop and promote a Manufacturing Technology Education Program that begins in high school, continues into post-secondary colleges, and leads to an associate degree. This will be a "Tech Prep" Program designed for the manufacturing industry. The core curriculum will be for a basic manufacturing education (i.e. not oriented to a specific industry or field). Students who successfully complete this basic curriculum will be encouraged to continue their education by specializing in a specific field of manufacturing. Also, MTAG advocates work-based learning combined with the students' academic learning.

MTAG's Mission

- Identify and communicate worker "core" competencies of the manufacturing sector for use in training the existing and future workforce
- Provide the State Board for Community & Technical Colleges and the Superintendent of Public Instruction with advice on competency based instruction.
- Advocate for the acceptance of these manufacturing core competencies throughout industry, labor, education, and government.
- Advise in the development of a Manufacturing Technology Associate Degree program that will teach students the broad and basic skills required to effectively function in today's increasingly complex and competitive manufacturing organizations.
- Link secondary and post secondary schools with local manufacturing companies to combine work based learning with academic and technical education - - a Tech Prep education program
- Support legislation which will enhance the climate for businesses to participate.

This document is one of several MTAG projects designed to accomplish this mission.

For additional information regarding MTAG or this document, please contact:

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SECTION A.

GROUP DYNAMICS AND COMMUNICATION

A. GROUP DYNAMICS AND COMMUNICATION

A1. Understand Importance of Working-in a Team Environment

A1.1. Identify the principles and skills of good teamwork.

Performance Objective: The student will be able to identify at least six general principles of good teamwork and discuss the personal responsibilities for each.

TEAMWORK SKILLS	
Effective communication skills	Decisions by consensus
Promote participation	Collaborative decision making
Shared goals	Work cooperatively
Giving feedback skills	Respect for all

A1.2. Demonstrate skills of good teamwork.

Performance Objective: In the classroom and/or work environment and using a checklist of the items in A1.1, the student will be able to consistently demonstrate the skills of good teamwork as judged by the other team members/classmates.

A1.3. Recognize the difference between a team environment workplace with a conventional workplace.

Performance Objective: The student will be able to compare and contrast the employee's role as a team member and individual in the workplace by discussing at least five characteristics of each.

TEAM MEMBER	INDIVIDUAL MEMBER
Group problem-solving	Individual assignments
Draws upon diverse experiences	Draws upon one person's experiences
Skills of many people	Skills of one person
Creativity of many	Creativity of one
Cross functional involvement	One person's job
Customer-supplier relationship	Supervisor-employee relationship
Shared goals	Individual tasks/job

A2. Understand the Etiquette and Importance of Working in a Team Environment

A2.1. Identify interpersonal characteristics of a team player.

Performance Objective: As a team member, the student will be able to openly and consistently share personal feelings, values, beliefs, interests, expectations, assumptions, imagination, and prejudice and listen to and respect the same characteristics and contributions of other team members as recorded by other team members over a period of six team meetings.

A TEAM PLAYER SHOULD:		
Initiate discussions	Elaborate ideas	Keep discussion focused
Suggest procedures	Seek opinions	Summarize
Clarify ideas	Seek information	Ensure all contribute
Share research	Work toward consensus	Clarify problems
Communication skills		

A2.2. Demonstrate the characteristics of a team player.

Performance Objective: With team members using a team player checklist, over the period of five different team meetings (at least one per month), the student will be able to consistently demonstrate the interpersonal characteristics as judged by the other team members.

A2.3. Contrast the role of a team with the role of an individual.

Performance Objective: The student will be able to discuss four differences between the role of the team and the role of the individual and how they work together.

TEAM ROLE	INDIVIDUAL ROLE
Support communication among members	Open and honest communication
Know total process	Know job/tasks
Solve large, complex problems	Solve task problems
Mutual support among members	Work alone
Long-term, systematic studies	Short-terms
Assign roles within the team	Individual role on team

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A3. Understand Business and Personal Ethics

A3.1. Identify good personal ethical characteristics* and behaviors.

Performance Objective: The student will be able to define personal ethical characteristics and give five examples related to the self and five examples related to others and the company.

OTHERS AND THE COMPANY	SELF
Respect ideas and beliefs of others	Possess knowledge & skills for the work to be done
Respect needs & goals of others	Accomplish assigned work
Appreciate & support work of others	No intentional unsafe activities
Will not impede work of others	Report injuries & unsafe conditions
Will not jeopardize safety of others	No drugs or alcohol
Will not fail to report injury to others	or working under the influence of
Will not damage property of others	No theft or lying
Insulting or obscene language/conduct	No intentional environmental
No misuse of company time or property	destruction
No fighting, intimidation or coercion	Have no weapons/explosives at work
Goals of others equal to one's own	Will not conceal defective work
goals	Will not falsify reports
	Will promote good housekeeping
	Will not intentionally have poor attendance

A3.2. Demonstrate good personal ethics.

Performance Objective: Using a checklist of personal ethical characteristics, the student will be able to describe from personal experiences situations that were ethical in nature and what was done in those situations that demonstrate the student's ethical values.

A3.3. Identify good ethical business behavior.

Performance Objective: The student will be able to identify who and what should be considered when making ethical decisions in the business community and provide examples of related decisions.

Business Ethics Considers		
Employees	Shareholders/Profits	Management
Environment	National interests	Suppliers
Community	Competitors	Customers
Self		

A3.4. Differentiate between good and poor business ethic practices.

Performance Objective: Given a variety of hypothetical ethical situations, the student will be able to state examples of both a good business practice and the poor business practice for each situation.

GOOD BUSINESS PRACTICES	POOR BUSINESS PRACTICES
Confidentiality and partnership with suppliers and customers	Reveal information and place suppliers and customers against each other
Confidentiality of employees' ethical issues	Reveal (gossip) employee's ethical issues
No gifts or gratuities from suppliers or customers	Take what you can get
Respect individuals and provide equally opportunities to all	Cronyism, good old boys, favoritism
Support community	Disregard community interest

A4. Understand Responsibilities of Employee to Employer and Vice Versa

A4.1. Match employee responsibilities to employer expectations.

Performance Objective: Given a job/position description, the student will be able to:

a) identify the knowledge and skills necessary to accept the responsibilities of the position,

b) state his/her strengths and weaknesses as they relate to the responsibilities, and provide evidence for each.

A4.2. Match employer responsibilities to employee expectations.

Performance Objective: Given a job/position description and an employer, the student will be able to identify the benefits offered by the employer (including hourly rate/salary, medical, dental, vacation, performance evaluations and merit pay, retirement plans, investment plans-401 K)and be able to compare these with those generally provided within an industry.

A5. Aware of Human Resources Issues (discrimination, harassment, and equality)

A5.1. Define discrimination, harassment, and equality.

Performance Objective: The student will be able to define and give two examples of harassment, discrimination and unequal treatment of employees.

Performance Objective: The student will be able to state how equal rights legislation (Equal Employment Opportunities, Affirmative Action, American Disabilities Act, etc.) affects and supports all employees.

A5.2. Demonstrate nondiscriminatory behavior.

Performance Objective: Given a series of written scenarios, video situations, the student will be able to identify examples of harassment, discrimination or inequality and state what should have been done in each situation.

A6. Understand Methods and Concepts of Problem Solving

A6.1. Explain the value of applying a problem-solving system.

Performance Objective: The student will be able to give characteristics of a systematic problem approach.

Stop and think	Research to discover root causes
Clarify the actual situation	Use consistent, systematic approach
See situation from different points of view (team approach)	

A6.2. Apply a system of problem-solving.

Performance Objective: Given a problem to be solved, the student will be able to apply and record a systematic sequence of steps to solve the problem and demonstrate its success.

1. Identify problem situation	6. Select best tentative solution
2. Gather data	7. Test selected solution
3. Define problem	8. Evaluate test data
4. Identify possible causes	9. Implement solution in the process
5. Identify hypotheses (possible solutions)	10. Monitor solution

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A6.3. Identify opportunities for applying problem-solving techniques.

Performance Objective: Given the classroom/workplace environment and a three-month period of time, the student will be able to identify opportunities to apply the problem-solving process in a variety of areas at least once a week.

AREAS OF POTENTIAL APPLICATION		
Process control	Goal setting	Political problems
Customer satisfaction	Conflict resolution	Human relations
Team communication		

A7. Demonstrate Team Member and Leadership Skills and Techniques

A7.1. Distinguish between the roles of a team member and team leader.

Performance Objective: Given the responsibility of the team leader or a team member, the student will be able to state at least six roles and responsibilities of each.

TEAM LEADER ROLE	TEAM MEMBERS' ROLE
Support/facilitate communication among members	Open and honest communication
Clarify customers and suppliers	Be working in the process under study
Be point of communication between team and outside organization	Should represent stages of the process
Avoid dominating the group	Represent different shifts, work areas, trades, professions, and jobs
Call and facilitate all meetings	Consider work on the team a priority
Keep of team records	Contribute fully to team project
Document the process and project	Participate in all meetings and discussions
Oversee preparation of reports and presentations	Has a right to understand all parts of the process
Still function as a team member	Carry out all assignments
Knowledgeable and skilled in Continuous Quality Improvement	Has thorough knowledge of job/tasks
General knowledge of total process	
Enable mutual support among members	
Assign team function roles	
Skilled in conflict resolution	

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A7.2. Perform techniques used as a team member.

Performance Objective: Given a job function, a checklist of team member responsibilities,. and a project team assignment, the student will be able to meet the responsibilities of a team member to the satisfaction of the team leader and other team members using the same checklist.

A7.3. Perform techniques used as a team leader.

Performance Objective: Given a job function, a checklist of leadership responsibilities, and a process study project team leadership assignment, the student will be able to meet the responsibility of a team leader to the satisfaction of the team members using the same checklist.

A8. Understand the Structure of Typical Manufacturing Organizations

A8.1. Define organizational structures.

Performance Objective: The student will be able to define the basic components of a typical manufacturing process and discuss how organizational structures are necessary for successful communication and plant operations.

MANUFACTURING COMPONENT	DEFINITION - RESPONSIBILITIES
Design/engineering	- the plans for the development of a product
	- the exact measurements and requirements for developing the product
Fabrication/purchase of components	- the building or purchase of individual parts, sections and tools for the product's production
Production/assembly	- the making of multiple parts and sub-assemblies of the product
	- the construction of the final product from the various parts and sections
Quality assurance	- a component of each of the other components

A8.2. Explain how specific organizational structures affect a manufacturing process.

Performance Objective: Given a manufacturing process flow chart and an organizational structure chart, the student will be able to explain the sequence of the process and how the components of the organizational effect the process.

A8.3. Justify the use of specific organizational structures in manufacturing.

Performance Objective: Given a typical organizational structure and production flow chart, the student will be able to explain and discuss the particular knowledge and skills associated with each organizational function and give reasons why each is necessary in the process.

A9. Understand Group Structure and Interactions of a Diverse Work Force

A9.1. Identify the characteristics of a diverse work force.

Performance Objective: The student will be able to identify six elements of a diverse workforce and discuss how each can contribute to the organization/business.

ELEMENTS OF DIVERSITY		
Race	Age	Gender
Disabilities	Ethnic group	Personalities
Work skills	Education	Religion

A9.2. Apply group dynamic principles to manufacturing situations.

Performance Objective: After studying principles of group dynamics and observing how they operate in actual group settings over a period of two weeks and noting them in a journal, the student will be able to identify examples of roles in three of six group processes.

GROUP PROCESSES	
Group decision-making	Group leadership
Group problem-solving	Group creativity
Group diversity and conflicts	Individual contribution/roles

GROUP TASK ROLES	
Initiator-contributor	Information seekers
Opinion seekers	Information givers
Opinion givers	Elaborator
Coordinator	Orienter
Evaluator/critic	Energizer
Procedural technician	Recorder

GROUP BUILDING ROLES	
Encourager	Harmonizer
Expediter	Compromiser
Standard setter	Observer-commentator
Follower	

A9.3. Communicate beyond the work group.

Performance Objective: Given the identification of the group's suppliers and the group's customers, the student will be able to communicate, orally and in writing, to the satisfaction of the group, with customers and with suppliers.

A9.4. Identify and plan for work group human resource requirements.

Performance Objective: Given a statement of work for the group, each student will be able to write and submit to the group, a list of the knowledge and skills necessary for the work to be done and an estimate of time necessary.

A10. Discuss Importance of Organizational Integration in Manufacturing a Product

A10.1. Explain organizational influences on manufacturing processes.

Performance Objective: Given the study of organizational influences, the student will be able to describe how they can improve or diminish effective and efficient manufacturing processes.

ORGANIZATIONAL INFLUENCES	
Employee respect and attitude	Management support
Channels of communication	"Chain of Command"
Vertical and/or horizontal	Cross-functional communication
Top-down and/or bottom-up communication	Cross-functional training
Formal and informal	Cross-functional quality teams
Customer-supplier communication	Location of decision-making

A11. Understand the Responsibilities of Line and Staff Organizations

A11.1. Define line and staff organizational structure.

Performance Objective: Given an organizational chart of a manufacturing operation, the student will be able to identify and list the responsibilities of line and staff organizations.

A12. Understand Electronic Communications in Linking Manufacturing Processes

A12.1. Identify possible electronic communication uses.

Performance Objective: Given three areas of electronic communication, the student will be able to cite at least two examples of electronic communication in each.

ELECTRONIC COMMUNICATIONS		
Person-to-person	Person-to-machine	Machine-to-machine
Spreadsheets	Local networks (LAN)	CAD-CAM
Word processing	Data bases	NC machines
P.I.M. (personal information management)	Engineering documentation (accrual, storage, retrieval)	
Statistical analysis	Wide area networks (WAN)	
Accounting		
Procurement		
Inventory control		
Customer support		

METHODS OF ELECTRONIC COMMUNICATION		
Direct (keyboard, stylist, mouse, scanner)	Via networks and direct link-up	Microwave/radiowave
Telephone (FAX/modem)		

LANGUAGE PLATFORMS		
DOS/WINDOWS	OS2	UNIX
XENIX		

COMMERCIALLY AVAILABLE COMPUTER APPLICATIONS SOFTWARE		
Database	CAD/CAM	Word Processor
Dbase	Autocad	WordPerfect
Paradox	Generic CADD	MS Word
RBase	TurboCad	Lotus AMI Pro
Foxpro	EasyCad	WordStar
Access		

SPREADSHEET	PERSONAL INFORMATION MANAGER	FLOW CHARTING AND GANDT
Lotus 123	Act	ABC Flow Charting
Excel	Echo	Milestones
	Crossties	

A12.2. Explain the effect of electronic communications versus other communication methods.

Performance Objective: After studying at least five different electronic communication processes and interviewing users, the student will be able to list both positive and negative aspects of each process.

ELECTRONIC COMMUNICATIONS	OTHER COMMUNICATION METHODS
FAX	Meetings
E-mail	Telephone
Modem exchanges	Memos
Local area networks	Person-to-person talk
CAD-CAM	Blue prints
Terminal monitor instructions	Paper instructions
Terminal video demonstrations	Personal demonstrations

A12.3. Select appropriate communication methods.

Performance Objective: Given a variety of needs and audiences, the student will be able to select the best mode of communication.

Audience size	Physical distance
Location of audience	Time constraints/time zones
Formal or informal style	Proprietary or public
Deadlines	Information or discussion
Legal requirements	

A13. Can Facilitate Group Meetings

A13.1. List the characteristics of a good group leader.

Performance Objective: After studying 15 to 20 good group leadership characteristics and observing their application, the student will be able to list 10 characteristics and discuss their value in a group.

FACILITATION SKILLS	
Assure all participate	Assure no person monopolizes discussion.
Plan the meeting, distribute agendas prior to the meeting, and follow agenda during meeting.	Be flexible, good ideas can either be incorporated as they arise or specifically planned for as a topic for the next meeting.
Listen carefully to participants who have ideas and input; focus on their suggestions and solicit other participants' opinions.	Don't allow long-winded speakers to overwhelm the meeting. Require complainers to suggest a resolution to the problem as well.
If there are guest speakers, have that person in the room at a specific point in the meeting, leaving the rest of the time to participants.	Develop sense of community, mutual support, and trust among committee members. A relaxed environment encourages participation and appreciation for associates.
Cultivate ownership by all participants in various facets of the project.	Build on suggestions of participants, encouraging others to join in the discussion.
Clarify concepts by restating them.	Direct energy toward positive action.
Point out similar aspects of differing opinions.	Adjust the level of support and direction to accommodate the needs of the group.
Set the standards of the group.	Relieve tension by diverting attention from the person to the issue.
Encourage participants to contribute by praising their comments and the contribution of others.	Seek information about relevant facts.
Raise questions about the direction of the group.	Ask participants if they are ready to make a decision.
Defend the rights of participants.	Summarize key points.

A13.2. Identify various group processes.

Performance Objective: The student will be able to list the group processes and give them a logical order to satisfy the business needs and the needs of most of the participants as judged by the group members.

GROUP PROCESSES/STEP	
Step 1	Identify problem or issue needing to be resolved.
Step 2	Define the nature of the problem.
Step 3	Analyze the nature of the problem.
Step 4	Recommend possible solutions.
Step 5	Test possible solutions against selected criteria and select the most satisfactory solution.
Step 6	Implement the best solution.

A13.3. Identify components of group dynamics.

Performance Objective: After observing and participating in group processes and using A9.2, A13.1 and A13.2, the student will be able to list a minimum of 15 components and influences on the group processes, the needs of the group, and the problems to be solved.

OTHER INFLUENCES ON GROUP DYNAMICS	
Leader's experience	Need for anonymity
Time restrictions	Technique characteristics
Need for structure	Preferred outcomes
Group or individual problems	Experience of participants
Need for recognition	Budgetary restraints

A13.4. Demonstrate group leadership and facilitation skills.

Performance Objective: Using the skills identified in A13.1, the student will be able to accept the responsibilities of a group leader.

A14. Write Manufacturing Instructions Logically and Efficiently

A14.1. List the steps of specific manufacturing processes.

Performance Objective: Given the components of the manufacturing process as identified in A.8.1 (Design/Engineering, Fabrication/Purchase of Components, Production/Assembly), the student will be able to develop reasonable manufacturing instructions for a specific manufacturing situation.

POSSIBLE STEPS FOR DEVELOPING LOGICAL MANUFACTURING PROCESSES:	
Step 1	Describe the manufacturing task to be done.
Step 2	List the materials and tools needed to do the job.
Step 3	Prepare a schedule.
Step 4	List human resources needed to do the job on schedule.
Step 5	Outline the skills required of personnel involved.
Step 6	Carefully explain the safety precautions and personal protective equipment required for the job.
Step 7	Explain each step required in the manufacturing process for a specific task.
Step 8	Describe how to clean up after working on the job for a day, including safety and environmental precautions.
Step 9	Verify the successful completion of the manufacturing process.

A14.2. Write in complete sentences.

Performance Objective: Given a need for manufacturing instructions, the student will be able to write complete sentences with no phrases or fragments.

All instructions must be written in complete sentences, with subject and predicate, to ensure that instructions are clear and that awkward or incomplete sentences are not the cause of misunderstanding on the par t of the employee who is reading manufacturing instructions. Unclear text can result in injury or death in a manufacturing environment.

A14.3. Use correct punctuation.

Performance Objective: The student will be able to use correct punctuation in all written documents.

A14.4. Use correct spelling.

Performance Objective: The student will be able to look up words and definitions in a standard dictionary and verify the spelling and meaning in the context of the written material.

Performance Objective: The student will be able to use and understand the limitations of a spell check function on a word processor.

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A14.5. Write with accuracy, brevity, and clarity.

Performance Objective: Given the task to write instructions for a machine's operation or any other writing, the student will be able to clearly, accurately, and briefly write the instructions.

A15. Write and Present Technical Reports

A15.1. Organize material with a logical flow.

Performance Objective: Given an assignment to present a report on a technical process, the student will be able to write and present a logical flow of information, including the use of charts and graphs, to a clear conclusion.

LOGICAL FLOW OF INFORMATION	
Step 1	Introduction: Purpose and scope
Step 2	Explain who is affected by this information
Step 3	Goals: What do you hope to accomplish?
Step 4	Information chunking into progressively deeper levels
Step 5	Implementation of the information as appropriate
Step 6	Conclusion and recommendations for action

A15.2. Organize an oral presentation.

Performance Objective: Given the task of organizing an oral presentation, the student will be able to provide evidence, in the form of preliminary notes, that the following issues were considered:

- Carefully consider the topic, doing research and gathering materials.
- Determine your audience and gear the presentation to them.
- Decide the focus of the presentation and whether or not visual aids are needed for audience's understanding of your topic.
- Plan interesting opening remarks that carry the audience into the flow of the presentation.
- Be familiar with the facility where you will be presenting and make sure necessary technical equipment will be there and set up. Make note of where the lights, microphone, podium (Do you want one?), wastebaskets, and restrooms are.
- Set up your notes in a concise or easy to follow way, such as on note cards or on several pages with lots of white space.
- Make sure you have done your homework; careless presentations offend the audience.

A15.3. Demonstrate good speaking characteristics.

Performance Objective: After cultivating and practicing good speaking characteristics, the student will be able to make an oral presentation effectively, without losing the attention of the audience.

Checklist Items:

1. Make eye contact with members of your audience, moving your gaze from one person to another as you speak.
2. Dress appropriately for the occasion. The audience should be focusing on what you say, not what you are wearing.
3. Stand in a relaxed manner, using good posture, and avoid nervous fiddling, such as clicking a ball-point pen. Keep your hands quietly on the podium or relaxed at your sides.
4. Walk some as you speak if the sound system allows. Moving around is more interesting for the audience.
5. Involve the audience throughout the presentation with eye contact, questions, workshop techniques, and other interactive measures.
6. If your kind of presentation does not call for interaction, keep the pace lively, changing the focus from visuals to handouts to flipchart, etc.
7. Don't be afraid to be funny, but make sure the humor is not at anyone else's expense, especially someone in the room. It's OK to laugh at yourself.
8. Be yourself.

A15.4. Demonstrate appropriate presentation demeanor.

Performance Objective: The student will be able to present in a professional manner by applying all facets of a good speaking demeanor.

The behavior of the presenter is that action speaks louder than words. Examples of good speaking demeanor are:

- Speak clearly and with confidence in yourself and the material being presented.
- Scan the faces of the audience for signs of waning interest and step up the pace or shift directions if you are losing them.
- Have a plan B, maybe a plan C, if you are losing the audience.
- Distribute handouts either at the beginning of the program or at the end; the confusion of passing out papers in the middle of a presentation draws the interest away from the speaker.
- Have overheads that can be seen and read by all members of the audience.
- Express an interest in all questions, even those that seem silly or shallow.
- Express your pleasure at being asked to speak at the start. Let the audience know you are glad to be there. This is a compliment to them.
- Thank the audience at the end of your presentation, and take time to mingle and converse afterwards if this is appropriate.
- Offer to mail materials to interested participants later and take their business cards. They'll feel singled out and special.

A16. Establish Customer Needs

A16.1. Interpret and clarify specifications prepared by others.

Performance Objective: Given a customer's request to produce an item, the student will be able to converse with the customer, restate the requirements, and clarify specifications to the satisfaction of the customer.

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A16.2. Communicate with customer to clearly define requirements.

Performance Objective: The student will be able to elicit from the customer clear statements of requirements and specifications and share related documentation throughout the process to assure quality improvement and customer satisfaction.

It is important to ask the customer questions about the service and product and to be open and receptive to those responses. At no time should the manufacturing representative become defensive and be offended by criticisms from the customer.

BERKSHIRE
PLASTICS
NETWORK

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BERKSHIRE PLASTICS NETWORK (BPN)

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The Berkshire Plastics Network (BPN), a consortium of more than 40 independent plastic companies in Berkshire County, represents virtually every discipline in the design and production of molds, components, and plastic products. The business office of the network is located in the Downing Industrial Park at 17 Downing Three, Pittsfield. Together, the members, totaling over 1650 employees, represent a $125 million local industry. Employment in the network is growing by 100 or more new jobs per year. Shop sizes range from one or two employees to businesses with 200+ workers.

The ten year old consortium was formed by entrepreneurial moldmakers who opened their own shops when GE eliminated its moldmaking and injection molding operations in the late '40s, early '50s. Now, some of these businesses are third generation, and some who started as toolmakers have naturally evolved into design, engineering and molding companies.

The BPN provides marketing and educational services to its members, including a state-accredited four year apprenticeship program for moldmakers. The BPN represents its members at trade shows resulting in prospective customers sending a request for quote to the network. The network provides its customers a one stop source of qualified suppliers to meet their plastics manufacturing needs, assurance of the latest technology and highest quality standards, reduced transportation requirements, simplified scheduling, faster turn-around time, and comprehensive technical support through seminars, workshops and synergistic problem solving.

Pooling resources among small to mid-sized companies creates a major treasure chest of capacity and capabilities. Specialties include high tolerance small parts, large parts, multipin connectors, appliances, elastomeric materials, engineering thermoplastics, and medical devices. The backbone of the network is its members, who dedicated over 2800 unpaid hours last year to support the operation and programs of the network through their ability to work together effectively. Plug into the Network! Call for more information today: 1-800-438-9572 or by Fax: 1-800-438-9574.

Rev. 5/2/96

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Mission

- Develop and maintain a body of recognized authority to actively promote and pursue the interests and advancements of the BPN.
- Provide high quality educational programs, management and marketing resources.
- Commit to helping members in various areas of:
  - Manufacturing Productivity
  - Quality Control
  - Training
  - Environmental Concerns

BERKSHIRE
PLASTICS
NETWORK

Objectives

The objectives of the BPN are as follows:

- Establish Berkshire County's reputation as the home to a world-class plastics industry,
- Establish dialogue with educators and practitioners at all levels, leading to widely recognized educational programs,
- Establish dialogue with elected and appointed officials at the city, county, state and federal levels leading to the understanding of public programs that may be of benefit to the membership.

BERKSHIRE
PLASTICS
NETWORK

Strategies

The BPN has a number of strategies for adding value:

- Providing members direct access to a variety of public and private resources and services,
- Promote and expand the alliance with educators at all levels for the joint benefit of the community and members,
- Explore any areas of interest pertaining to improving the quality or value of the products and services supplied by the membership,
- Promote profitable growth and image of the BPN and its members through development and implementation of marketing strategy.

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NETWORK

Education Initiatives

The BPN has a number of initiatives underway:

- Massachusetts School-to-Work Program
- BCC Industry Alliance
- Moldmaker Apprenticeship Program
- Processing Apprenticeship Program
- Professional Development Programs

Wisconsin Youth Apprenticeships and the Manufacturing/Production Industry

Division of Workforce Excellence

What are Youth Apprenticeships?	**Youth apprenticeships** offer opportunities for juniors and seniors in high school to prepare for a career while still in school. Two year programs combine academic education, occupational instruction and work based learning with an employer.
Program Goals	Youth apprenticeship programs help: ◆ students acquire the skills needed for the jobs of tomorrow, and ◆ business and industry develop a highly skilled workforce to remain competitive in the world marketplace.
Employer Benefits	**Employers** play an active role in shaping the quality of their future workforce when participating in youth apprenticeship programs. They can: ◆ improve the skill level of potential workers, ◆ recruit and screen potential employees, ◆ reduce employee turnover by hiring youth apprentice graduates ◆ help develop skill standards geared to meet their needs, and ◆ improve their competitive positioning in the world marketplace.
Employer Responsibilities	**Industry** takes the lead in defining the skills to be learned in the youth apprenticeship programs by setting the skill standards in the statewide curriculum. Employers in a local program will: ◆ select, hire and agree to train students a minimum of 10-15 hours per week over four semesters and a summer, ◆ pay youth apprentices minimum wage or higher, ◆ provide youth apprentices with worker's compensation coverage, ◆ sign an agreement with the student, parents and school specifying expectations and responsibilities, ◆ provide skilled mentors to supervise and train youth apprentices, ◆ involve labor in designing and operating the program if appropriate, ◆ evaluate and report on youth apprentice's job performance.

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Manufacturing/ Production Technician Curriculum	Representatives of a wide range of Wisconsin manufacturing companies set the standards included in the curriculum. It defines specific competencies students must master through combined classroom and work based instruction.
Core Areas	Students must master competencies in four units: ◆ Manufacturing Fundamentals ◆ Manufacturing Materials and Processes I ◆ Manufacturing Materials and Processes II ◆ Organizational Systems and Quality
Certification	Students will be awarded a Certificate of Occupational Proficiency by the Department of Industry, Labor & Human Relations (DILHR) when they successfully complete their high school diploma requirements and achieve the skill standards in the four units of the Manufacturing/Production Associate curriculum.
Technical College Credit	Students will be eligible for advanced standing credits at a Wisconsin Technical College offering a manufacturing related associate degree.
Student Benefits	Education is more relevant to the real world when students combine learning and thinking in the classroom with the application of knowledge and skills in the workplace. Students in the youth apprenticeship program will: ◆ see first hand the connection between education and work, ◆ strengthen their academic skills, ◆ explore their interest in a manufacturing career, ◆ earn wages while learning from skilled professionals, ◆ earn a state-recognized certificate upon completion, ◆ earn advanced standing credits in a technical college, and ◆ increase their career options and future employability.

For more information about participating in the Wisconsin Youth Apprenticeship Manufacturing/Production Technician Program contact your local high school, or the:

Division of Workforce Excellence
201 East Washington Avenue
P.O. Box 7946
Madison, WI 53707
(608) 266-0223 Fax (608) 261-6698

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DWE-10200-P (R.9/95)

SKILLS for the FUTURE
WISCONSIN

STATE OF WISCONSIN YOUTH APPRENTICESHIP

Occupational Cluster Analysis
for the

Manufacturing Plastics

March 9, 1995

An occupational analysis was conducted on the manufacturing plastics field to develop curriculum for the Wisconsin Manufacturing Plastics Youth Apprenticeship Program.

DACUM, one method of conducting occupational analysis, was used to identify current industry needs. Small group brainstorming techniques were used by trained facilitators to aid the Panel of Experts in developing this DACUM research chart. The chart describes the manufacturing plastics occupation in terms of the duties and tasks performed by workers.

The DACUM process uses expert workers to describe their occupation. The job can be described in terms of DUTIES (arbitrary groupings of tasks) and TASKS (observable units or work).

Sponsored by:
Wisconsin Department of Industry, Labor and Human Relations, Division for Workforce Excellence
Wisconsin Department of Public Instruction, Office of School to Work
Wisconsin Technical College System Board

Coordinated by:
Moraine Park Technical College District

Facilitated by:
Lisa Stich,
Moraine Park Technical College

Mary Ann Passehl,
Moraine Park Technical College

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OCCUPATIONAL
FOR THE MANUFACTURING P

	DUTIES				
A	Setup Process Equipment	A-1 Prepare material per specification	A-2 Check safety requirements	A-3 Install tool	A-4 Enter setup data
B	Operate Machine	B-1 Apply work instructions	B-2 Add materials	B-3 Remove product from machine	B-4 Monitor output and quality
C	Perform Quality Control	C-1 Qualify raw material	C-2 Qualify product to standard	C-3 Perform visual inspection	C-4 Participate in capability studies
D	Perform Secondary Operations	D-1 Perform joining/ assembly operations	D-2 Perform decorating operations	D-3 Perform deflashing operations	D-4 Perform machining operations
E	Participate in Team Functions	E-1 Participate in team based problem solving	E-2 Participate in on-going training	E-3 Participate in meeting team goals	E-4 Participate in communicating team results
F	Prepare Product for Shipment	F-1 Prepare packaging	F-2 Pack product	F-3 Apply documentation	

OCCUPATIONAL TITLES

- Machine Operator
- Material Handler
- Inspector
- Apprentice
- Assistant Setup Person
- Laboratory Assistant
- Utility Person
- Tooling Assistant

WORKER TRAITS/ATTITU

- Positive Attitude
- Punctual
- Flexible
- Healthy
- Cooperative
- Continuous Learner
- Safety Conscious
- Team Player
- Responsible
- Creative
- Self-Motivated
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USTER ANALYSIS
ICS — YOUTH APPRENTICESHIP

S

A-5 Start up machine	A-6 Perform start up inspection	A-7 Make process adjustments	A-8 Shut down machine	A-9 Remove tool
B-5 Maintain process parameters	B-6 Request machine tool maintenance and repair	B-7 Record data (Production, Quality)	B-8 Clean work area	B-9 Perform routine maintenance
C-5 Calculate control charts	C-6 Measure product			
D-5 Reclaim materials				
E-5 Train other team members	E-6 Participate in continuous improvement process			

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KNOWLEDGE/SKILLS

Math
Blueprint Reading
Plastic/Polymer Material Properties
Plastic/Polymer Material Chemistry (Basic)
Reading and Writing
SPC
Computer Literacy
Oral Communication
Listening Skills

Industry Knowledge
Customer Focus
Interpersonal Relationship Skills
Government/Safety Regulations
Company/Organization
Recycling of Plastics
Science of Plastics
Organic Chemistry
Plastics Processing Methods

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Task List for Assistant Operator:

D 000	PARTICIPATING IN TRAINING
D 001	Participate in in-house training.
D 008	Network with co-workers, suppliers, customers, and competitors.
E 000	ANALYZING COSTS
E 003	Determine materials usage on part weight, shot size, scrap, and rework.
E 009	Determine customer needs and volume relationships.
E 010	Reduce costs of production.
F 000	PERFORMING SECONDARY OPERATIONS
F 001	Interact with other departments.
F 002	Select secondary operations.
F 006	Log data.
F 008	Perform packaging operations.
F 009	Assess non-conformity for accurate rework and scrap disposal.
F 010	Meet production requirements.
G 000	VERIFYING PART QUALITY FOR SPECIFICATIONS
G 002	Log quality data.
G 007	Communicate results and/or findings orally and/or in writing.

Task List for Operator

D 000	PARTICIPATING IN TRAINING
D 007	Participate in outside training such as computer usage, etc.
E 000	ANALYZING COSTS
E 002	Determine cost of quality.
F 000	PERFORMING SECONDARY OPERATIONS
F 005	Perform SPC/Quality audits.
G 000	VERIFYING PART QUALITY FOR SPECIFICATIONS
G 001	Perform measurements and/or visual inspections.
G 004	Perform SPC interpretations.

Task List for Lead Operator:

A 000	APPLYING PROCESSING TECHNIQUES
A 005	Perform procedural quality control.
D 000	PARTICIPATING IN TRAINING
D 008	Network with co-workers, suppliers, customers, and competitors.
E 000	ANALYZING COSTS
E 004	Determine cost of raw materials.
E 005	Determine effects of cycle time on costs.
E 006	Determine labor effects on costs.
F 000	PERFORMING SECONDARY OPERATIONS
F 004	Verify results of secondary operations.
G 000	VERIFYING PART QUALITY FOR SPECIFICATIONS
G 003	Read part prints.

Task List for Material Handler:

A 000	APPLYING PROCESSING TECHNIQUES
A 004	Dry material.
D 000	PARTICIPATING IN TRAINING
D 004	Attend supplier seminars and training.
F 000	PERFORMING SECONDARY OPERATIONS
F 004	Verify results of secondary operations.

Task List for Set-Up Person:

A 000	APPLYING PROCESSING TECHNIQUES
A 001	Adjust temperature and heat requirements.
A 002	Adjust pressure requirements.
A 003	Apply open and closed-loop processing techniques.
D 000	PARTICIPATING IN TRAINING
D 003	Attend job related seminars.
D 008	Network with co-workers, suppliers, customers, and competitors.
F 000	PERFORMING SECONDARY OPERATIONS
F 003	Perform set-up.

Task List for Molding Technician:

A 000	APPLYING PROCESSING TECHNIQUES
A 006	Determine process control parameters.

Task List for Molder:

D 000	PARTICIPATING IN TRAINING
D 002	Read industry publications.
D 005	Attend trade shows.
G 000	VERIFYING PART QUALITY FOR SPECIFICATIONS
G 005	Assess equipment capability.

Personal Qualities

The following tasks identify attributes for the SCANS Personal Qualities. These statements can be used to provide evidence of the presence of Personal Qualities. Each of the Personal Qualities begins with the SCANS definitions and then a list of appropriate attributes.

Responsibility: Exerts a high level of effort and perseverance towards goal attainment. Works hard to become excellent at doing tasks by setting high standards, paying attention to details, working well, and displaying a high level of concentration even when assigned an unpleasant task. Displays high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.

1. Maintains self control in difficult situations.
2. Works without being easily distracted.
3. Has a lot of energy when completing tasks.
4. Accomplishes tasks as scheduled.
5. Meets performance expectations even if they require extra effort beyond what is normally expected.
6. Follows instructions willingly.
7. Judges accurately the amount of work he/she can accomplish.
8. Does not waste materials or supplies.
9. Gets work done despite difficulties.
10. Sticks with a job until it is finished.
11. Takes good care of tools and equipment.
12. Shows up on time and ready to work.
13. Gets work done on time.
14. Accepts responsibility for job and follows through with a minimum of close supervision.
15. When facing a problem, continues to try different approaches until the job is finished.

Self-Esteem: Believe in own self-worth and maintains a positive view of self; demonstrates knowledge of own skills and abilities; is aware of impact on others; and knows own emotional capacity and needs and how to address them.

16. Asks questions or asks for help when needed.
17. Works well in a team, when required.
18. Is calm when discussing problems.
19. Arrives at work relaxed and cheerful.
20. Accepts responsibility for own errors.
21. Seeks information about responsibilities when in doubt.
22. Does not distract or annoy others.
23. Is eager to learn about new developments and ways of doing things.
24. Sets a good example for other employees.
25. Maintains personal appearance that is suitable for the job.
26. Comes to work on time.
27. Avoids over-dependence on others.
28. Responds well to suggestions for improvement.

Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings. Asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.

29. Doesn't make fun of others.
30. Is tactful when pointing out mistakes of others.
31. Is cheerful and friendly toward other employees.
32. Communicates effectively to other workers and supervisors.
33. Gets along well with supervisors.
34. Gives help and encouragement to others.
35. Shows cooperation and consideration in working with others.
36. Shows patience when teaching others.
37. Demonstrates stability and self control in stressful situations.
38. Shows friendly interest in other people.
39. Listens to the opinions of others.
40. Expresses point of view effectively in a group.
41. Makes an effort to meet others halfway in conflict situations.
42. Is able to work out disagreements between people.

Self-Management: Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; is a "self-starter."

43. Performs duties effectively with a minimum of supervision.
44. Organizes work to make best use of time.
45. Does acceptable work in the absence of supervision.
46. Is willing to work overtime.
47. Adapts own work behavior to fit the requirements of other team members.
48. Uses slack time productively without waiting for directions from supervisors.
49. Makes independent decisions, when necessary.
50. Comes up with new ideas about how to do the job efficiently.
51. Plans each day's work ahead of time.

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Integrity/Honesty: Can be trusted. Recognizes when faced with making a decision or exhibiting behavior that may break with commonly-held personal or societal values; understands the impact of violating these beliefs and codes on an organization, self, and others; and chooses an ethical course of action.

52. Dresses appropriately for the job.
53. Avoids "bad-mouthing" the company or employer.
54. Comes to work on the days scheduled.
55. Does fair share of the work.
56. Adapts work habits to changes in rules, procedures, and situations.
57. Is careful not to endanger the safety of others.
58. Follows appropriate safety regulations.
59. Demonstrates positive attitude toward company or employer.
60. Follows the rules about hours, vacations, time off, sick leave, etc.
61. Volunteers to help when there is a crisis or heavy work load.
62. Notifies supervisor when unable to come to work as scheduled.

SCANS Essential Skills

The changing nature of work is addressed by the Secretary's Commission on Achieving Necessary Skills (SCANS). The STC expressed concern that there is more to work than just technical proficiencies. To address this concern, the IWG's were asked to identify what they do on the job in the SCANS categories and, in addition, how they used Basic Skills and Thinking Skills, as well as describe the Personal Qualities essential to being a successful plastics occupation person.

This section contains the results of the IWG's work. Each page was reviewed by a IRT working with an IWG to ensure completeness and accuracy and to establish a bridge of confidence between business and the education community that these pages accurately report the input of IWG's on how they use the SCANS competencies on the job.

The SCANS terminology was changed to terms used in the Indiana Proficiency Curriculum Guide, published by the Indiana Department of Education. Each of the following pages is organized as follows:

Foundation Proficiency Statement: The Foundation Proficiency Statement is the definition of the major SCANS area under which the Specific Proficiency Statement appears. It is the definition reported by SCANS and it puts the Specific Proficiency into the context of the world of work in general.

Specific Proficiency Statement: The Specific Proficiency Statements provide an IWG interpretation of how a SCANS competency, such as Allocates Time, is performed as part of the job.

Proficiency Indicators: Proficiency Indicators identify how the Basic Skills, Thinking Skills and Personal Qualities from SCANS are manifested in the context of the Specific Proficiency Statement.

The SCANS competencies are organized into five broad categories. These are the Foundation Proficiency Statements reported as follows:

Resources: Identifies, organizes, plans, and allocates resources.

Specific Proficiency Statements include:

1. Allocates time.
2. Allocates money.
3. Allocates material and facility resources.
4. Allocates human resources.

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Information: Acquires and uses information.

Specific Proficiency Statements include:

5. Acquires and evaluates information.
6. Organizes and maintains information.
7. Interprets and communicates information.
8. Uses computers to process information.

Interpersonal: Works with others.

Specific Proficiency Statements include:

9. Participates as a member of a team.
10. Teaches others.
11. Serves clients/customers.
12. Exercises leadership.
13. Negotiates to arrive at a decision.
14. Works with cultural diversity.

Systems: Understands complex interrelationships.

Specific Proficiency Statements include:

15. Understands systems.
16. Monitors and corrects performance.
17. Improves and designs systems.

Technology: Works with a variety of technologies.

Specific Proficiency Statements include:

18. Selects technology.
19. Applies technology to task.
20. Maintains and troubleshoots technology.

The following Proficiency Indicators are reported in the context of the Specific Proficiency Statement. They include:

Basic Skills:

1. Reading
2. Writing
3. Arithmetic
4. Mathematics
5. Listening
6. Speaking

Thinking Skills:

7. Creative thinking
8. Decision making
9. Problem solving
10. Seeing things in the mind's eye (visualizing)
11. Knowing how to learn
12. Reasoning

Personal Qualities:

13. Responsibility
14. Self-esteem
15. Social
16. Self-management
17. Integrity/Honesty

Plastics Technical Competency Profile

Printed and distributed by:

Center on Education and Training for Employment
College of Education
The Ohio State University
1900 Kenny Road
Columbus, Ohio 43210

Plastics Job Definitions

Production Associate—**An operator of plastics processing equipment. Technical skills should include, but not be limited to:**

- safety issues in plastic processing
- trimming/finishing operation
- visual inspection for appearance/defects
- performs basic quality procedures (e.g., use of go/no go gauges, calipers, scales)
- document process information (e.g., production reports, traceability, SPC charts)

Preferred Minimum Education Level: High School Graduation or GED equivalent

Set-Up Person—**An individual who set-ups plastics processing equipment utilizing set-up specifications and prints. Technical skills should include, but not be limited to:**

- has above plus
- enhanced safety training
- can read and understand set-up sheets, follow written instruction, keep records
- set-up tooling and auxiliary equipment
- can startup and run initial samples
- basic tooling and equipment maintenance
- material handling capabilities

Preferred Minimum Education Level: High School Graduation or GED equivalent

Maintenance Person—**An individual who maintains, troubleshoots, and repairs equipment. Technical skills should include, but not be limited to:**

- work experience of set-up/production associate
- advanced safety requirements
- understanding of electrical, hydraulic, pneumatic and mechanical systems on processing and related equipment
- reading schematic diagrams
- basic machining capabilities
- basic welding
- document changes

Preferred Minimum Education Level: High School Graduation or GED equivalent

Plastics Job Definitions

Quality Assurance Person—An individual who monitors and documents products conformance to specifications. Technical skills should include, but not be limited to:

- work experience of set-up/production associate
- reads prints
- maintain calibration program
- generate first piece inspection
- can apply SPC technologies
- handling the responsibility of being in an unpopular position
- capability of team problem solving

Preferred Minimum Education Level: High School Graduation or GED equivalent

Process Technician—An individual who troubleshoots and corrects processing problems. Would also be used to improves processes. Technical skills should include, but not be limited to:

- has above plus
- abilities of quality assurance
- knowledge of material properties
- capability of team problem solving

Preferred Minimum Education Level: Two-year Applied Associate Degree and/or Postsecondary Apprenticeship Certificate

Journeyman—An individual who possesses the technical skills of the molder, set-up, maintenance, quality assurance, and processing technician.

Preferred Minimum Education Level: Completion of an 8,000 hour Apprenticeship Program or a Two-year Applied Associate Degree and several years of experience

Baccalaureate Degree—An individual who has obtained a four-year degree in either (1) Plastics Manufacturing/Processing or Materials Science; (2) Industrial Technology with an emphasis in plastics; or (3) an area of Engineering Technologies with a capstone in plastics.

Plastics Technical Competency Profile Index

p.3 **Unit: Communications Literacy**
p.19 **Unit: Mathematics Literacy**
p.29 **Unit: Science Literacy**
p.48 **Unit: Technology Literacy**

Unit: Employability Skills

p.50 Competency: Develop a career plan
p.51 Competency: Prepare for employment
p.52 Competency: Evaluate the importance of self-esteem as an employability skill
p.52 Competency: Demonstrate job retention skills
p.53 Competency: Demonstrate knowledge of work ethic
p.53 Competency: Exhibit appropriate work ethic
p.54 Competency: Apply decision-making techniques
p.54 Competency: Apply problem-solving techniques
p.55 Competency: Exhibit characteristics for job advancement

Unit: Professionalism

p.56 Competency: Project professional image
p.56 Competency: Achieve individual and professional goals
p.57 Competency: Manage personal finances
p.57 Competency: Support community well-being
p.57 Competency: Achieve organizational goals
p.58 Competency: Demonstrate positive relations in the workplace
p.58 Competency: Manage stressful situations
p.59 Competency: Analyze effects of family on work and work on family
p.59 Competency: Apply lifelong learning skills
p.60 Competency: Manage professional development

Unit: Teamwork

p.61 Competency: Demonstrate knowledge of teamwork
p.62 Competency: Demonstrate teamwork
p.62 Competency: Use teamwork to solve problems
p.63 Competency: Conduct team meetings

Unit: Technical Recording and Reporting

p.64 Competency: Demonstrate technical recording skills
p.64 Competency: Demonstrate technical reporting skills

Plastics Technical Competency Profile Index (continued)

Unit: Problem Analysis
p.65 Competency: Appraise situations
p.65 Competency: Analyze potential problems
p.65 Competency: Analyze actual problems
p.66 Competency: Analyze decision(s)

Unit: Project Management
p.67 Competency: Explain project management
p.67 Competency: Plan projects
p.67 Competency: Implement projects
p.68 Competency: Evaluate projects

Unit: Computer Literacy
p.69 Competency: Describe personal computer operations
p.69 Competency: Explain information processing cycle
p.70 Competency: Operate computer hardware
p.70 Competency: Use software

Unit: Basic Economics
p.71 Competency: Explain basic economic concepts
p.71 Competency: Identify cost and profit influences
p.72 Competency: Explain basic business concepts

Unit: Workplace Safety (Level 1)
p.73 Competency: Describe general workplace safety and hazards and understand both personal and company responsibility
p.74 Competency: Apply general workplace safety precautions/procedures
p.75 Competency: Perform first aid
p.75 Competency: Explain purpose of industrial pollution control systems
p.76 Competency: Maintain environmental health and safety regulations
p.76 Competency: Explain basic ergonomics in the workplace

Unit: Workplace Safety (Level 2)
p.77 Competency: Maintain cardiopulmonary resuscitation (CPR) certification

Plastics Technical Competency Profile Index (continued)

Unit: Industrial Electricity

p.78 Competency: Explain basic industrial electricity theory
p.78 Competency: Use the National Electrical Code (NEC)
p.78 Competency: Explain operation of electrical distribution systems
p.79 Competency: Maintain basic electrical systems
p.79 Competency: Read and apply electrical/electronic drawings
p.80 Competency: Demonstrate proficiency in direct current (DC) circuits
p.81 Competency: Demonstrate proficiency in alternating current (AC) circuits
p.82 Competency: Demonstrate proficiency in power distribution systems
p.82 Competency: Demonstrate proficiency in power distribution equipment
p.83 Competency: Demonstrate proficiency in motors and motor control
p.84 Competency: Apply electromechanical maintenance management practices

Unit: Electrical Test and Measurement Equipment

p.85 Competency: Demonstrate proficient use of electrical test equipment
p.85 Competency: Demonstrate proficient use of electrical measurement equipment

Unit: Drafting Technology

p.86 Competency: Apply basic drafting skills
p.87 Competency: Apply advanced drafting skills
p.88 Competency: Prepare mechanical drawings
p.89 Competency: Explain geometric dimensioning and tolerancing
p.89 Competency: Convert dimensions and tolerances
p.90 Competency: Demonstrate dimensioning techniques
p.91 Competency: Apply geometric dimensioning and tolerancing

Unit: Print Reading

p.92 Competency: Interpret drawings/prints/schematics
p.93 Competency: Interpret structural drawings

Unit: CAD Fundamentals

p.94 Competency: Demonstrate basic use of computer operating system
p.95 Competency: Operate a CAD system

Plastics Technical Competency Profile Index (continued)

Unit: Equipment Maintenance

p.97 Competency: Perform housekeeping
p.97 Competency: Perform recordkeeping
p.98 Competency: Inspect machine systems
p.98 Competency: Perform machine maintenance
p.99 Competency: Maintain hand tools
p.99 Competency: Maintain portable power tools
p.100 Competency: Maintain stationary equipment

Unit: Electromechanical Technology

p.101 Competency: Interpret electromechanical drawings
p.101 Competency: Describe and demonstrate proficiency in transducers (sensors) and instrumentation

Unit: Basic Machining

p.103 Competency: Perform prerequisite machining skills
p.103 Competency: Analyze machine shop jobs
p.103 Competency: Explain basic machining operations
p.104 Competency: Perform bench operations
p.104 Competency: Operate metal cutting saw
p.105 Competency: Operate drill press
p.105 Competency: Operate tool and cutter grinding machine
p.106 Competency: Operate pedestal grinder
p.106 Competency: Operate lathe
p.107 Competency: Operate milling machine
p.108 Competency: Operate surface grinder
p.108 Competency: Select materials for job
p.109 Competency: Explain nontraditional machining processes
p.110 Competency: Demonstrate use of precision layout devices

Unit: Hydraulics and Pneumatics

p.111 Competency: Describe fluid flow concepts
p.111 Competency: Describe energy considerations
p.112 Competency: Describe system losses
p.112 Competency: Describe hydrostatics
p.112 Competency: Design basic hydraulic/pneumatic system
p.113 Competency: Describe component operation
p.113 Competency: Interpret hydraulic and pneumatic schematics
p.113 Competency: Perform hydraulic system maintenance and repair

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Plastics Technical Competency Profile Index (continued)

Unit: Hydraulics & Pneumatics (continued)

p.114 Competency: Maintain piping and accessories for high and low pressure fluid power systems
p.114 Competency: Maintain hydraulic system components
p.115 Competency: Troubleshoot hydraulic systems
p.115 Competency: Describe reciprocating and rotary air compressors
p.116 Competency: Maintain pneumatic systems
p.117 Competency: Maintain vacuum systems
p.117 Competency: Calculate energy

Unit: Industrial Manufacturing Technology (Level 1)

p.118 Competency: Describe industrial manufacturing process
p.118 Competency: Describe materials requirements planning
p.119 Competency: Describe role of supply materials
p.119 Competency: Describe plant layouts
p.119 Competency: Describe material flow
p.120 Competency: Maintain quality control of materials handling
p.120 Competency: Describe post-production control
p.121 Competency: Analyze a manufacturing project

Unit: Industrial Manufacturing Technology (Level 2)

p.122 Competency: Demonstrate knowledge of JIT
p.122 Competency: Apply JIT

Unit: Programmable Logic Controllers (PLCs)

p.123 Competency: Differentiate among process controls
p.123 Competency: Explain basic operation of PLCs
p.124 Competency: Demonstrate use of PLCs
p.125 Competency: Apply robot fundamentals

Unit: Welding Basics

p.126 Competency: Explain welding/cutting processes
p.127 Competency: Perform basic gas welding, brazing, and cutting
p.127 Competency: Perform basic arc welding/cutting (i.e., stick)
p.128 Competency: Evaluate welds

Unit: Supervision

p.129 Competency: Perform supervisory functions
p.130 Competency: Coordinate training

Plastics Technical Competency Profile Index (continued)

Unit: Quality Assurance (Level 1)

p.131 Competency: Demonstrate knowledge of inspection
p.132 Competency: Demonstrate knowledge of quality assurance
p.133 Competency: Explain importance of interdepartmental relationships to quality assurance
p.133 Competency: Demonstrate knowledge of basic statistics
p.133 Competency: Demonstrate knowledge of precontrol

Unit: Quality Assurance (Level 2)

p.134 Competency: Demonstrate knowledge of engineering a quality product
p.134 Competency: Inspect machinery, materials, and products
p.135 Competency: Use testing equipment
p.135 Competency: Demonstrate knowledge of nondestructive testing
p.136 Competency: Demonstrate knowledge of basic statistics
p.136 Competency: Demonstrate knowledge of precontrol
p.136 Competency: Construct X and R charts
p.137 Competency: Interpret X and R charts
p.137 Competency: Demonstrate knowledge of scattergrams
p.138 Competency: Use quality control charts
p.138 Competency: Demonstrate knowledge of process capability
p.139 Competency: Demonstrate knowledge of quality/cost implications
p.139 Competency: Manipulate quality cost data
p.139 Competency: Manipulate cost control data

Unit: Quality Assurance (Level 3)

p.140 Competency: Demonstrate knowledge of engineering a quality product
p.140 Competency: Demonstrate knowledge of probability theory
p.141 Competency: Conduct process improvement studies
p.141 Competency: Explain importance of interdepartmental relationships to quality assurance
p.141 Competency: Demonstrate knowledge of quality/cost implications

Unit: Plastics Press Technology (Level 1)

p.142 Competency: Explain press operation
p.142 Competency: Demonstrate knowledge of auxiliary press accessories

Plastics Technical Competency Profile Index (continued)

Unit: Plastics Press Technology (Level 2)

p.143 Competency: Explain various controls
p.143 Competency: Perform preventive maintenance of control systems
p.143 Competency: Prepare setup sheet
p.144 Competency: Describe basic press operations
p.144 Competency: Describe relay control operations
p.144 Competency: Describe solid state control operations
p.145 Competency: Describe NC and CNC control operations

Unit: Sheet Metal Fabrication

p.146 Competency: Describe sheet metal fabrication
p.146 Competency: Describe types of metal fabrication manufacturing
p.147 Competency: Explain machining fabrication processes
p.147 Competency: Layout sheet metal
p.147 Competency: Fabricate components
p.148 Competency: Perform sheet metal fabrication

Unit: Moldmaking (Level 1)

p.149 Competency: Explain basics of building molds
p.150 Competency: Explain heating and cooling of molds
p.150 Competency: Explain injection mold runners and gates

Unit: Moldmaking (Level 2)

p.151 Competency: Explain heating and cooling of molds
p.151 Competency: Describe the machining and/or manufacturing of plastics tooling

Unit: Polymer Technology (Level 1)

p.152 Competency: Demonstrate knowledge of plastics
p.153 Competency: Demonstrate basic knowledge of rubber manufacturing
p.153 Competency: Define plastics materials
p.154 Competency: Describe additives
p.155 Competency: Demonstrate knowledge of polymer chemistry
p.155 Competency: Describe basic polymer processing
p.156 Competency: Prepare polymer blends and alloys
p.156 Competency: Demonstrate knowledge of polymeric testing
p.157 Competency: Perform analytical testing of polymeric materials
p.158 Competency: Describe effects of weathering and aging on polymeric materials

(continued on next page)

Plastics Technical Competency Profile Index (continued)

Unit: Polymer Technology (Level 1 continued)

p.158 Competency: Tensile test polymeric materials
p.159 Competency: Identify electrical and weathering properties
p.159 Competency: Identify optical properties and material characterization tests
p.160 Competency: Identify flammability, chemical properties, and analytical tests
p.160 Competency: Identify tests and identification analysis of polymers
p.160 Competency: Identify testing of foam plastics and nondestructives

Unit: Polymer Technology (Level 2)

p.161 Competency: Demonstrate knowledge of polymer chemistry
p.162 Competency: Apply instrumental methods of analysis

Unit: Plastics Troubleshooting (Level 1)

p.163 Competency: Identify abnormal conditions

Unit: Plastics Troubleshooting (Level 2)

p.164 Competency: Correct abnormal conditions

Unit: Plastics Product Design

p.165 Competency: Define product requirements
p.165 Competency: Select a plastic material based on evaluating constraints
p.166 Competency: Describe plastic product design concepts
p.167 Competency: Select process based on criteria
p.168 Competency: Describe advanced part/tool design concepts

Unit: Color Matching (Level 1)

p.169 Competency: Explain how color is perceived
p.169 Competency: Explain color measurement principles
p.169 Competency: Analyze colorants
p.170 Competency: Formulate colored plastic compounds

Unit: Color Matching (Level 2)

p.171 Competency: Interpret spectral curves
p.171 Competency: Explain industry coloring materials

Plastics Technical Competency Profile Index (continued)

Unit: Instrumental Methods (Level 1)

p.172 Competency: Explain principles of instrumental analysis
p.172 Competency: Explain microscopy methods
p.172 Competency: Explain non-destructive testing methods
p.173 Competency: Perform instrumental analysis

Unit: Instrumental Methods (Level 2)

p.174 Competency: Explain spectroscopic methods
p.174 Competency: Explain thermal analysis methods
p.174 Competency: Explain chromatographic methods

Unit: Rheology

p.175 Competency: Describe the effects of heat on polymers
p.175 Competency: Describe types of polymer flow
p.175 Competency: Describe the effects of polymer flow on molded parts
p.176 Competency: Describe the influence of orientation in thermosets
p.176 Competency: Describe the concepts of shear rheology
p.177 Competency: Describe the effects of orientation in injection molded parts
p.177 Competency: Describe the effects of orientation in compression molded parts
p.177 Competency: Describe the effects of orientation in transfer molded parts
p.177 Competency: Describe the effects of orientation in extruded parts
p.178 Competency: Describe processes which induce little orientation
p.178 Competency: Describe the effects of orientation in reinforced molded parts
p.179 Competency: Describe viscoelasticity using dynamic mechanical rheology and methods

Unit: Plastics Manufacturing (Level 1)

p.180 Competency: Identify plastic forms
p.180 Competency: Identify property enhancers
p.181 Competency: Identify plastics processing methods
p.181 Competency: Describe fiberglass reinforced plastics (FRP) method
p.182 Competency: Describe thermoforming processes
p.182 Competency: Describe expansion and coating processes
p.183 Competency: Assemble plastics
p.183 Competency: Print/coat plastics
p.184 Competency: Explain surface preparation
p.184 Competency: Describe annealing
p.184 Competency: Explain deflashing

Plastics Technical Competency Profile Index (continued)

Unit: Plastics Manufacturing (Level 2)

p.185 Competency: Transport plastic parts from mold
p.185 Competency: Perform physical testing on final parts
p.185 Competency: Apply extrusion method
p.186 Competency: Apply compression molding method
p.186 Competency: Apply injection molding method
p.187 Competency: Apply blow molding method
p.187 Competency: Apply thermoforming method(s)
p.187 Competency: Apply rotational molding method
p.188 Competency: Apply calendering method
p.188 Competency: Apply foam processes method
p.188 Competency: Apply powder coating method(s)
p.189 Competency: Describe thermoset sheet molding (i.e., mechanical forming)
p.189 Competency: Describe slush, rotational, and dip casting
p.189 Competency: Describe transfer molding
p.190 Competency: Describe pressure forming
p.190 Competency: Describe vacuum forming
p.190 Competency: Describe polymer nomenclature
p.191 Competency: Finish/assemble plastic products
p.192 Competency: Demonstrate basic knowledge of material handling
p.193 Competency: Demonstrate basic knowledge of material types for proper handling procedures
p.193 Competency: Demonstrate basic knowledge of material drying techniques
p.194 Competency: Describe basic knowledge of regrind materials
p.194 Competency: Describe basic knowledge of blending/mixing material
p.195 Competency: Demonstrate knowledge of material conveying and loading systems

p.196 **Sample Glossary of Terms**

INDUSTRIAL PLASTICS:
Theory and Application
Second edition

Terry L. Richardson
Northern State College
Aberdeen, South Dakota

Delmar Publishers Inc.®

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FUNDAMENTALS OF INJECTION MOLDING

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Including:

Commercial and Administrative Practices
Molding Guidelines
Glossary of Terms
Reference Publications

Molders Division

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A guide to Change-Overs
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Introduction to Plastics
- Polymerization
- Thermosets & Thermoplastics
- Amorphous & Crystalline
- Properties
- General Properties
- Plastics Modification
- Materials and Processing
- Questions

Injection Molding Machine Cycle
- Fundamental Principles
- Injection Molding Machine Cycle
- Injection Molding Machine
- Machine Control Systems
- Injection Molds
  - Two-Plate Molds
  - Multiplate Molds
  - Runners

Machine Setup
- Flow and Pressure
- Time
- Movement
- Temperatures

Fault Recognition
- Problems & causes
- Troubleshooting

Simulation
- Select part & material
- Setup the machine
- Simulate parts made
- Analyze the results
- Change settings
- Correct problems
- Make a good part

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Learn the "what", "why" and "how" of injection molding technology.

Module 1
Basic Injection Molding

Fundamentals of injection molding technology, including basic knowledge that all personnel involved with the molding process must understand in order to make informed decisions on the production floor.

Recommended For

- Machine Operators
- Material Handlers
- Set-up Personnel
- Production Supervisors

Lesson 1: Inside the Molding Machine
Shows and describes all major components of the molding machine.

Lesson 2: Inside the Mold
Construction and operation of two-plate, three-plate and runnerless molds.

Lesson 3: The Nature of Plastics
Characteristics, types, structure, size and processing behavior.

Lesson 4: Machine Operating Controls - Part 1
Purpose, operation and effects of pressure and fill rate controls.

Lesson 5: Machine Operating Controls - Part 2
Purpose, operation and effects of machine and mold temperature, timers, screw and clamp controls.

Module 2
Advanced Injection Molding

Essential information for those who must understand molding technology at the expert level. Emphasis is on building an in-depth understanding of the relationships between machine controls, plastic behavior during molding and finished part properties.

Recommended For

- Molding Managers
- Production Supervisors
- Process Engineers
- Quality Assurance Personnel

Lesson 1: The Structure of Molded Parts
Structure of polymer molecules and different structures that develop in molded parts: crystalline, amorphous, and oriented.

Lesson 2: Plastics Flow Behavior
How plastics flow, orient and change their viscosity. How molecular orientation affects part directional properties, frictional heating and fiber orientation.

Lesson 3: How Temperature, Flow and Cooling Effect Part Structure
How changes in any one of these process variables effect molding conditions and finished part properties.

Lesson 4: How Molded-in Stress Effects Part Properties
Effects of cavity pressure on internal stress, cooling rates, plastic shrinkage, and part strength.

Lesson 5: Plastic Processing Conditions - The Key to Controlling Part Properties
How to analyze and solve problems using the four primary plastic processing variables: temperature, pressure, flow and cooling.

Lesson 6: Using Machine Control Adjustments to Control Plastic Processing Conditions
How control changes effect plastic processing conditions and finished part properties.

Module 3
Improved Molding Machine Operations

"Hows and whys" of process improvements with specific rules, procedures and explanations for controlling raw materials and molding, along with optimizing control settings and machine operation. Students will learn how to increase productivity and reduce rejects through better control of the molding process.

Recommended For

- Machine Operators
- Supervisors
- Lead Persons
- Set-up Personnel
- Foremen

Lesson 1: Start-up Procedures
Pre-start procedures, initial control settings, mold hook-up, checking raw material, setting temperatures, cushion size and melt decompression.

Lesson 2: Setting Machine Controls
Using fill rate, injection pressures, temperature settings and timer settings to optimize part properties and correct common defects.

Lesson 3: Operating Methods and Economics
In-depth summary of maximizing production efficiency. Avoiding common problems and production errors. Important safety rules and procedures.

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MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

An "x" in the box indicates the task was deemed essential by the Technical Committee and, therefore, is required in the stated level of instruction.

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : MEASUREMENT AND LAYOUT			
1	Demonstrate steel rule use	x	x	x
2	Demonstrate protractor use	x	x	x
3	Demonstrate calipers use	x	x	x
4	Demonstrate dividers use	x	x	x
5	Demonstrate combination square use	x	x	x
6	Demonstrate micrometers use	x	x	x
7	Demonstrate vernier scales use	x	x	x
8	Demonstrate gauges use	x	x	x
9	Demonstrate gauge blocks use	x	x	x
10	Demonstrate dial indicators use	x	x	x
	DUTY : BLUEPRINT READING			
11	Interpret blueprints	x	x	x
12	Identify jigs/fixtures	x	x	x
13	Identify molds	x	x	x
	DUTY : QUALITY CONTROL			
14	Identify quality control concepts	x	x	x
15	Troubleshoot quality control problems	x	x	x
16	Apply statistical process control	x	x	x
	DUTY : ELECTRICAL POWER			
17	Define electrical concepts	x	x	x
18	Demonstrate electrical safety procedures	x	x	x
	DUTY : FLUID POWER			
19	Interpret fluid schematics	x	x	x
20	Interpret fluidic formulas	x	x	x
	DUTY : MECHANICAL POWER			
21	Use basic mechanical devices	x	x	x

MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : MANUFACTURING PROCESSES			
22	Describe manufacturing processing methods	x	x	x
23	Identify fastener types	x	x	x
24	Identify packaging techniques	x	x	x
	DUTY : MATERIAL IDENTIFICATION			
25	Identify material types and properties	x	x	x
	DUTY : EVALUATING EMPLOYMENT IN THE PLASTICS PRODUCTION INDUSTRY			
26	Describe major machine tender/operator duties		x	
27	Describe major qualifications		x	
28	Name entry requirements		x	
29	Identify salary range		x	
30	Identify fringe benefits		x	
31	Describe advancement opportunities		x	
32	Complete application form		x	
33	Practice acceptable housekeeping principles		x	
	DUTY : DESCRIBING THE OPERATION OF A MOLDING MACHINE			
34	Identify molding machine parts		x	
35	Identify molding machine functions		x	
36	Describe molding machine controls		x	
37	Describe molding machine start-up		x	
38	Describe molding machine operation		x	
39	Describe molding machine shutdown procedures		x	

MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : DIFFERENTIATING BETWEEN ACCEPTABLE AND NONACCEPTABLE PARTS			
40	Describe molding defects		x	
41	Recognize flash		x	
42	Recognize sink marks		x	
43	Recognize warp		x	
44	Recognize contaminated parts		x	
45	Recognize wet materials		x	
46	Recognize stuck parts		x	
47	Recognize a short shot		x	
48	Recognize burn marks		x	
49	Recognize surface blemishes		x	
	DUTY : OPERATING A MOLDING MACHINE			
50	Practice proper operational procedures and safety		x	
51	Describe plastics behavior (in the molding machine)		x	
52	Describe machine-plastic-molded parts relationships		x	
53	Describe pre- and post-molding factors		x	
54	Describe statistical process control basics		x	
55	Trim parts excess material		x	
56	Grind scrap plastic (for reuse)		x	
57	Package finished product		x	
58	Assemble molded product		x	
59	Perform visual defects inspection		x	
	DUTY : PERFORMING DAILY MACHINE TENDER DUTIES			
60	Lubricate mold		x	
61	Complete daily material list		x	
62	Clean hopper magnets		x	
63	Fill machine hoppers		x	
64	Empty grinders		x	
65	Make boxes		x	
66	Relieve on presses		x	
67	Clean molding machine area		x	
68	Set up hopper loader		x	
69	Maintain hopper loader		x	

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MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : PERFORMING ROUTINE MOLDING MACHINE MAINTENANCE			
70	Lubricate molding machine		x	
71	Clean plastics grinder		x	
	DUTY : MAKING UP PLASTIC MIXES			
72	Use proper regrind ratio		x	
73	Set up gram scale		x	
74	Select proper dry color		x	
75	Select proper thermoplastics material		x	
76	Operate tumbler		x	
	DUTY : SETTING UP MATERIAL DRYER			
77	Disassemble dryer		x	
78	Clean dryer		x	
79	Reassemble dryer		x	
80	Set up dryer		x	
81	Select proper drying perimeters		x	
	DUTY : TESTING SAMPLES			
82	Perform Burn test			x
	DUTY : EVALUATING EMPLOYMENT AS A QUALITY CONTROL WORKER			
83	Describe duties			x
84	Describe qualifications			x
85	Describe quality control worker/production relationship			x
86	Name job entry requirements			x
87	Identify salary range			x
88	Identify fringe benefits			x
89	Describe advancement opportunities			x
90	Name five area employers (hiring quality control workers)			x
91	Complete application form			x
92	Practice acceptable housekeeping principles			x

MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : INTERPRETING BLUEPRINT INFORMATION			
93	Interpret detail/assembly drawings			x
94	Interpret dimensions			x
95	Interpret tolerances			x
	DUTY : DEMONSTRATING THE SPC PROCESS			
96	Describe SPC terminology (upper & lower control limits, X and R charts, process in control; process out of control)			x
97	Describe product's critical dimensioning			x
98	Mark drawings for critical dimensions			x
99	Measure products (with dial vernier calipers)			x
100	Demonstrate SPC process			x
	DUTY : IDENTIFYING MOLDING DEFECTS			
101	Describe molding defects			x
	DUTY : CHECKING PARTS FROM PRODUCTION			
102	Prepare daily quality control schedule			x
103	Identify part print's critical dimensions			x
104	Record quality control findings			x
105	Report production defects			x
106	Maintain "in process" goods			x
107	Label "in process" goods			x
108	Approve parts			x
	DUTY : IDENTIFYING MOLD OPERATION			
109	Describe the mold			x
110	Disassemble mold base			x
111	Identify mold parts			x
112	Reassemble mold base			x

MANUFACTURING TECHNOLOGY CLUSTER MATRIX
PLASTICS COMPONENT

		Manufacturing Technology Core	Plastics Machine Tender/Operator	Plastics Trainee
	DUTY : SETTING UP TEMPERATURE CONTROLLER/CHILLER			
113	Identify parts			x
114	Identify operating controls			x
115	Identify proper water hookups			x
116	Set up mold temperature controller			x
117	Start machine			x
	DUTY : DESCRIBING THE MOLD CHANGE PROCESS			
118	Describe molding machine controls			x
119	Describe mold changing			x
	DUTY : CHANGING MOLD			
120	Mold change checklist			x
	DUTY : SETTING MOLDING MACHINE CYCLE			
121	Set molding machine cycle			x
	DUTY : OPTIMIZING MOLDING CYCLE-MOLDING PROBLEMS AND SOLUTIONS			
122	Describe molding machine controls			x
123	Describe plastic's behavior in injection molding machine			x
124	Describe machine-plastic-molded part relationships			x
125	Define pre- and post-molding factors			x
126	Optimize molding cycle			x

Section III
Michigan School-to-Work Resources

A. **Michigan Business Resources**

B. **School-to-Work Programs in Michigan**

C. **Plastics School-to-Work Programs in Michigan**

D. **MOIS & MCCTE Resources**

Michigan School-to-Work Resources

Section III-A:

Michigan Business Resources

- One of the major projects of the Roundtable was to conduct a plastics company survey. The survey was supported by the Jobs Commission and administered by Michigan State University. See the enclosed Questionnaire for topics covered. The Company Survey Narrative and the Survey Report provide detailed analysis of the results. As expected, one of the biggest concerns of plastics companies throughout the state is **workforce development**.

- It is difficult to acquire and maintain a complete data base for the plastics industry throughout the state. One source is the Stephens' Electronic Plastics Directories. The Data Base Summary shows over 1300 companies, sorted by county, in the plastics industry which includes materials, equipment, and molds. The Sort Codes shows the variety of sub-topics into which data can be organized.

- Another source of plastics education is through grants from the Economic Development Job Training Program. The fact sheet explains the process whereby plastics companies can partner with a training provider, often times their local community college, to develop and conduct a specific training program. The EDJT Outline shows the typical steps in the process. A complete packet of information and applications can be obtained by contacting the Michigan Jobs Commission.

MICHIGAN JOBS TEAM

MICHIGAN BUSINESS ROUNDTABLES

Michigan Plastics Industry Roundtable

A partnership between Michigan's plastics firms and the Michigan Jobs Commission

Executive Committee:
Larry Eisenga, Chairman, *Blue Water Plastics*
Michael Clancy, *Libralter Plastics, Inc*
John Davis, *Dupont*
Arthur Goodsell, *Huron Plastics Group inc*
Diane Timmer, *Bissell Inc*
Rick Zinser, Executive Director, *MPIR*

Members:
Agape Plastics
American Commodities Incorporated
American Plastic Toys, Inc.
AMP Industries
Attwood Corporation
Automation Graphics & Design, Inc.
BASF Wyandotte
B&L Technologies
Becker Group inc. c/o APT
Bekum America Corporation
Bissell Inc
[illegible]
[illegible]
[illegible] Products Ltd.
Creative Foam
Crocker Limited
[illegible] Company
[illegible]
[illegible] Mold, Inc.
Exotic Rubber and Plastic
Fabri-Kal Corporation
Geiger Technic, Inc.
GEL Inc
Gilreath Manufacturing, Inc.
Huron Plastics Group, Inc.
[illegible] Corporation
Iso-Truss Inc
[illegible]
Lacks Industries Inc.
Libralter Plastics, Inc.
Luckmarr Group
Michigan Plastic Products Company
Michigan Roll Form Inc.
Moran, inc.
Nicholas Plastics Inc
Pine River Plastics inc
Plastigage Corp.
Plastipak Packaging
Regal Plastics
Size Reduction Specialists Corp.
Spo Plastics
Special Plastic Products Incorporated
Team One Plastics, Inc.
Tek Mold
Triple S Plastics
UBE Machinery
W-L Molding Co.
Wolverine Plastic Technologies inc

Universities/nonprofits:
[illegible] Plastics Council
[illegible] Michigan University
[illegible] State University
[illegible] Community College
Michigan Manufacturing Technology Center
Michigan Materials & Processing Institute
Michigan State University
Society of the Plastics Industry Inc.
University of [illegible], Flint

October 4, 1996

Dear Plastics Industry Executive:

I would like to introduce you to the Michigan Plastics Industry Roundtable which is made up of business executives from the Michigan plastics industry. The Roundtable's mission is to identify common problems and opportunities, share expertise and develop new working relationships that improve competitiveness, create jobs and develop the workforce in Michigan. The Plastics Roundtable works closely with state government on issues that are important to Michigan's plastics industry.

To help us better understand your concerns and what you see as the principal obstacles or opportunities to gaining or retaining jobs here in Michigan, we are asking you to complete the enclosed survey. Your responses will guide the Roundtable as to where we should direct our efforts to effect change within the industry and within public agencies.

Please direct this survey to someone in your organization who is knowledgeable about your company's dealings with employment issues, the business environment and state government in Michigan. (If your company has more than one facility in Michigan this survey should be passed on to the person who can respond for your company's statewide operations.) Answering the enclosed questions should take about 15 minutes. After you have completed the survey, please return it by Friday, October 18 in the addressed, stamped envelope. No individual company responses will be published, but you will be provided a summary of the aggregate, statewide results.

Your company is invited to participate in the Michigan Plastic Industries Roundtable and its activities, such as the upcoming plastics "Town Hall" meetings in Oakland County and Lansing this fall or the first, statewide Plastics Summit in April 1997. For information on Roundtable activities or to be added to the official mailing list, please call (517) 373-6214.

The Michigan Plastics Industry Roundtable is one of nine Business Roundtables formed in partnership with the Michigan Jobs Commission to promote industry competitiveness. The Roundtables consist of executives from a cross-section of each industry who meet regularly to develop industry-driven agendas, based on input such as plastics firms' response to this survey. Thank you very much for your company's cooperation.

Sincerely,

Larry Eisenga

Larry Eisenga
Chairman, Plastics Industry Roundtable

Enclosure

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Michigan Plastics Industry Roundtable Questionnaire

USE NO. 2 PENCIL ONLY

Proper Mark ●

I. Company Information:

1. Company Name: ____________________

2. Address: ____________________

3. City/Zip: ____________________

4. Phone: (   ) ______________   FAX: (   ) ______________

5. Contact Person: ____________________

6. Name of Parent Company: ____________________

7. Location of Parent Company: ____________________

8. Year company founded: ____________   9. Year Michigan operations established: ____________

10. Your company has more than one plant facility in Michigan?
Yes (Go to Q. 11) ○
No (Go to Q. 12) ○

11. If your company has more than one plant facility in Michigan, your responses to this survey are:
○ for this facility only
○ for all of your firm's Michigan operations

12. Where are most of your major customers located? (Indicate top two, 1st and 2nd)

	1st only	2nd only		1st only	2nd only
Local (neighboring counties)	○	○	Other regions in the U.S	○	○
Michigan wide	○	○	Nationwide	○	○
Midwest states	○	○	Worldwide	○	○

13. Rank your firm's top two product lines: (Indicate top two, 1st and 2nd)

	1st only	2nd only		1st only	2nd only
Resins	○	○	Packaging	○	○
Machinery	○	○	Consumer Goods	○	○
Automotive Products	○	○	Electronics	○	○
Molds	○	○	Other: __________	○	○

14. Where are most of your suppliers located (all materials)? (Indicate top two, 1st and 2nd)

	1st only	2nd only		1st only	2nd only
Local (neighboring counties)	○	○	Other regions in the U.S.	○	○
Michigan wide	○	○	Nationwide	○	○
Midwest states	○	○	Worldwide	○	○

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15. Do you export to other countries?	Yes ○	No ○
16. Do you have customers in Canada?	Yes ○	No ○
17. Do you have suppliers in Canada?	Yes ○	No ○
18. Do you export to Mexico?	Yes ○	No ○

II. Employment and Training Information

1. Number of employees currently employed in Michigan ________ (Per Q.11. answer)
Of that, number employed in: Professional ________
Trades ________
Semi-skilled ________

2. Do you plan to employ additional workers in the next year in Michigan?

	Yes	No	How many?
Entry level	○	○	________
Skilled level	○	○	________
Professional level	○	○	________

3. How do you fill job openings? (Check all that apply, but rank top two, 1st and 2nd)

	ENTRY LEVEL			SKILLED OPERATOR MAINTENANCE		
	Check ALL that apply	1st only	2nd only	Check ALL that apply	1st only	2nd only
MESC	○	○	○	○	○	○
Private employment agency	○	○	○	○	○	○
Other business	○	○	○	○	○	○
Internship high schools	○	○	○	○	○	○
2- or 4-year colleges	○	○	○	○	○	○
Newspaper ads	○	○	○	○	○	○
Referrals	○	○	○	○	○	○
Walk-in applications	○	○	○	○	○	○
Other: ________	○	○	○	○	○	○

	ENGINEERING POSITION			SUPERVISORS MANAGERS		
	Check ALL that apply	1st only	2nd only	Check ALL that apply	1st only	2nd only
MESC	○	○	○	○	○	○
Private employment agency	○	○	○	○	○	○
Other business	○	○	○	○	○	○
Internship high schools	○	○	○	○	○	○
2- or 4-year colleges	○	○	○	○	○	○
Newspaper ads	○	○	○	○	○	○
Referrals	○	○	○	○	○	○
Walk-in applications	○	○	○	○	○	○
Other: ________	○	○	○	○	○	○

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4. Which types of training does your company use? (Please rank by importance - least important = 1 to most important = 3)

	1	2	3
In-house	○	○	○
Community College course	○	○	○
Proprietary	○	○	○

5. In what areas do you feel your business could be assisted by training? (Rank top two, 1st and 2nd)

	1st only	**2nd only**		**1st only**	**2nd only**
ISO 9000	○	○	Teamwork skills	○	○
School-to-Work Programs	○	○	Waste reduction	○	○
Production technologies	○	○	CAD/Design	○	○
Other: ______________	○	○			

6. Estimate how much you spend annually on training?

$1 - 20,000	○	$50,001 - 100,000	○
$20,001 - 50,000	○	more than $100,000	○

7. Do you have difficulty finding skilled workers?

	Yes	**No**	**Currently how many openings?**
Entry level operator	○	○	________
Skilled operator/maintenance	○	○	________
Engineering position	○	○	________
Supervisors/managers	○	○	________

III. Business Environment in Michigan

1. Which of the following do you consider the most important (non-regulatory) challenges facing Michigan's plastic products industry and/or your company? (Check ALL that apply, but rank top two 1st and 2nd)

	Check ALL that apply	**1st only**	**2nd only**
Utility costs	○	○	○
Finding skilled employees	○	○	○
Upgrading training current employees	○	○	○
Competing with lower cost regions	○	○	○
Foreign competition	○	○	○
Educational system	○	○	○
Other: ____________________	○	○	○

2. What is the most positive aspect of doing business in Michigan? (Check ALL that apply, but rank top two 1st and 2nd)

	Check ALL that apply	**1st only**	**2nd only**
Qualified workers	○	○	○
Property tax cuts	○	○	○
Strong economy	○	○	○
Educational system	○	○	○
Access to markets	○	○	○
Transportation infrastructure	○	○	○
Low-cost utilities	○	○	○
Other: ____________________	○	○	○

2. What is the most negative aspect of doing business in Michigan? (Check ALL that apply, but rank top two 1st and 2nd)

	Check ALL that apply	1st only	2nd only
Zoning and property rights issues	○	○	○
Utility costs	○	○	○
Environmental regulations	○	○	○
Transportation infrastructure	○	○	○
Dependence on automotive industry	○	○	○
State governmental regulation	○	○	○
Workers' compensation	○	○	○
Unemployment insurance	○	○	○
Taxes	○	○	○
Other (please list): ________________	○	○	○

4. Is your firm involved in:

Local School-to-Work Programs?	Yes ○	No ○
Internship?	Yes ○	No ○

IV. Assistance

1. Does your firm currently have access to / use the World Wide Web? Yes ○ No ○

2. What type(s) of information on the Web would be most useful to you? (Check ALL that apply and rank top two. 1st & 2nd)

	Check ALL that apply	1st	2nd
Plastics Roundtable news/newsletter	○	○	○
Upcoming Plastics Roundtable events and conferences	○	○	○
Information on economic development and workforce programs of benefit to plastics firms	○	○	○
Identification of and links to other plastics Web sites	○	○	○
Technical information on (new) process, materials or equipment/university research and institutes	○	○	○
A plastics bulletin board or "newsgroup" to exchange information and comments	○	○	○
Access to technical experts for problem-solving	○	○	○

3.

Are you considering investment in or expansion of YOUR facilities?	Yes ○	No ○
If yes, are you considering Michigan expansion or investment?	Yes ○	No ○
Are you considering expansion outside Michigan?	Yes ○	No ○

4. In what areas do you feel that university technical assistance could assist your business? (Check ALL that apply, but rank two 1st and 2nd)

	Check ALL that apply	1st only	2nd only
Technical (shop floor) efficiencies	○	○	○
Recycling	○	○	○
Marketing	○	○	○
Exporting	○	○	○
New product material development	○	○	○
Other (Please list): ____________________________	○	○	○

If you need information on any economic development programs, assistance or incentives, please call the Michigan Jobs Commission's Customer Assistance Line at (517) 373-9808

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V. Value-added production

One of the ways to increase employment in the plastic products industry in Michigan is through increased value-added production and the identification of new uses, new compounds, and new markets, e.g., using auto-related plastic technology to produce furniture industry products.

What types of plastics production processing do you think hold the most promise for the Michigan Plastics Industry to expand by adding value to our plastic products?

Thank you for your response

Michigan Plastics Industry Roundtable
Company Survey

DRAFT

Purpose:

Since the beginning of the Roundtable two years ago, many questions have been raised regarding the state of the plastics industry in Michigan. Therefore it was decided that one of the specific objectives of the grant from the Jobs Commission was to conduct a state-wide survey to assess plastics firm's perceptions on the business climate, projected growth, recruiting and training, and similar topics. This information will provide a better understanding of the trends and issues of plastics manufacturing and result in state-level policies to support the industry. Because the main focus of the grant was workforce development, the information from the survey will be used here to help demonstrate the need for more and better school-to-work programs throughout the state.

Methodology:

The Michigan Center for Career and Technical Education at Michigan State University was chosen as the administrator of the project because of their experience with surveys. The questionnaire was developed over several months with focus groups from representative plastics companies. A mailing list was compiled by the Jobs Commission from a variety of sources. On October 4, 1996 a packet was mailed to 868 companies which included a cover letter, the questionnaire, and a self-addressed envelope. The target date for returns was October 18. A total of 185 usable responses were received for a 21.3% return rate. This level of response is considered more than satisfactory by survey experts for this type of project.

Summary of Results:

A host of organizations will use the results of the survey for their own specific purposes. The focus here will be on the implications for school-to-work projects, primarily from section II on Employment and Training Information.

> [Sharon: the tables are great, we just need to include the question numbers].

SECTION I. COMPANY INFORMATION

Questions 1-9 requested basic contact information.

> [Sharon: question 9, "years in operation", should be included with a table; I suspect it would demonstrate that plastics is still a relatively new industry].

10. More than one facility in Michigan: It is probably no surprise to readers that about one third

of the responding companies have multiple facilities in the area. It does suggest that companies have been expanding and are willing to remain in the same general location.

12. Location of customers: The highest response, 32%, is that customers are located nation wide.

13. Product lines: As expected, the largest products are automotive. However, this question elicited 28 "other" products such as medical, furniture, and construction, which shows the tremendous diversity of plastics applications.

14. Location of suppliers: Although suppliers can be nation wide and world wide there are substantial suppliers locally, within Michigan, and within the Midwest states.

15-18. Exports: Significantly, over 75% of companies surveyed export to other countries, almost all to Canada, and about two-thirds to Mexico. So Michigan companies are clearly doing business internationally.

SECTION II. EMPLOYMENT AND TRAINING INFORMATION

1. Number of employees in Michigan: 71,000

> [Sharon: Do 21.3% of the companies employ this many people? Must be some large companies that are skewing this. It would be good to have a frequency diagram of the size of company responding, e.g. 1-50 employees, 51-100, 101-200, etc.
> Also, the total of professional, trades, and semi-skilled employees only adds up to about 18,000.

2. Plan to hire additional workers: 80% of the companies plan to hire additional entry level workers, 69% will hire more skilled workers, and 60% will require additional professional level employees. The total anticipated need is 2,455 new employees, which is a 3.5% increase over the current 71,000 and much less than expected. We have heard all along that the growth has been about 20% at all levels.

> [Sharon: I do not know how to account for this discrepancy. Perhaps the 20% figure includes turnover and the 3.5% is the actual positions that need to be filled? Also the yes/no responses for entry level do not equal 100%].

3. How to fill job openings: for entry level and skilled employees companies are primarily using adds, referrals, and walk-ins. For engineering positions companies use adds, referrals, agencies, and colleges. For managers they use referrals, adds, and agencies.

Note that the internship/high school source is utilized for entry level employees by only 23% of companies and hardly at all for other employee levels. The Roundtable is in agreement that this is an under-developed feeder system that has the best potential for improving the employment situation.

[Sharon: I suspect that many positions at the other levels are filled by internal promotion but we failed to include that as a response category].

4. Types of training: Rated most important is in-house training at 44%, proprietary training at 29%, and community college training at 19%. This would indicate that companies are doing much of their training themselves and that community colleges are significantly under utilized. This may be because the local community college currently does not offer training in the topics needed by plastics companies. Perhaps the plastics companies and their local community college need to work together more intensively to analyze and develop appropriate curricula which can then be delivered either by traditional coursework or customized in the seminar format for specific company needs.

[Sharon: the table should include the percent of total for each column].

5. Training assistance: The ranking of topics is clear, this is what would help the businesses. The question is, can the training providers fulfill this need? Again, high school and community college programs (grades 11-14) could be doing much more to help companies.

6. Training expense: If the mid-point of each range is multiplied by the number of companies, the total training expense for this sample is $6.3 million. If this figure is projected across the entire industry in the state the total would be $29.6 million with an average of $37,000 per company per year. Obviously this is a substantial expense on education. Perhaps as much as half that amount could be saved if more school-to-work programs were implemented that included skills for business, manufacturing, and plastics.

7. Finding skilled workers: clearly the majority of companies have trouble finding workers, especially the skilled level which usually refers to set-up technicians and machine maintenance. The sample also shows a substantial number of current unfilled openings; if this is projected for the entire industry there could be 6700 openings identified throughout the state.

SECTION III: BUSINESS ENVIRONMENT

1. Most important challenges: 90% of companies rated "finding skilled employees" as the number one challenge facing Michigan's plastics industry. The category that received the highest rating for second most important challenge was "upgrading/training current employees". These trends confirm what Roundtable members have already identified, and forthunately, both the State and the Education community are taking steps to improve the situation. But much more work is needed.

2. Most positive aspect: There are only two choices concerned with workforce development, "qualified workers" and "educational system", both of which are rated low.

4. Involved in school-to-work: only 30% of companies. Involved in internship: only 40% of

companies which probably includes more college interns than high school students. Yet 90% of the companies identified their biggest challenge as finding skilled employees (question III.1 above), so it would appear that school-to-work and internship programs are under utilized.

CONCLUSION

Business is good. Plastics companies are growing, hiring additional employees, and expanding their facilities. But the number one challenge is finding enough skilled people to support this growth. Companies currently have many unfilled openings and plan to add even more positions this year. Secondly, companies are providing an enormous amount of training for current employees. At least part of the answer to these problems seems to be the development of a larger and more highly skilled pool of workers for the plastics industry. This presents a tremendous opportunity for industry and education to work together in a win-win situation and is directly addressed elsewhere in this Guide.

I. Company Information

10. Your company has more than one plant/facility in Michigan?

	Frequency	Percent
Yes	56	31.6%
No	121	68.4%
Total	177	100%

11. If your company has more than one plant/facility in Michigan, your responses to this survey are:

	Frequency	Percent
This facility only	24	38.1%
Firm's MI operations	39	61.9%
Total	63	100%

12. Where are most of your major customers located?

	1st only		*2nd only*	
	Frequency	Percent	Frequency	Percent
Local (neighboring counties)	28	15.9%	7	4.9%
Michigan wide	40	22.7%	28	19.8%
Midwest states	38	21.5%	30	21.2%
Other regions in the U.S	7	3.9%	20	14.1%
Nationwide	56	31.8%	20	14.1%
Worldwide	7	3.9%	36	25.5%
Total	176	99.7%	141	99.6%

**Total percentages do not equal 100% due to rounding*

13. Rank your firm's top two products lines: (Indicate top two, 1st and 2nd)

	1st only		*2nd only*	
	Frequency	**Percent**	**Frequency**	**Percent**
Resins	7	4.0%	2	2.0%
Machinery	13	7.4%	7	7.1%
Automotive Products	67	38.5%	16	16.3%
Molds	21	12.0%	14	14.2%
Packaging	15	8.6%	8	8.1%
Consumer Goods	15	8.6%	22	22.4%
Electronics	4	2.2%	5	5.1%
Other:	32	18.3%	24	24.4%
Total	174	99.6%	98	99.6%

**Total percentages do not equal 100% due to rounding*

Other:

- Corrosion products
- Medical equipment & Office furniture
- Hot runnerless systems
- Plastic parts
- Medical (2)
- Machine components
- Prototypes
- Fillers
- Molded plastic parts
- Specialty chemicals
- Office furniture
- Machine tool
- RV
- Insulation
- Furniture (2)
- Constructions
- Drainage pipe
- Silicon dies
- Building products
- Custom tooling
- Compounds
- Shapes
- House wares
- Construction compounds
- Vinyl hose
- Prototype molds
- Industrial/commercial electrical distribution compounds
- Hydraulic

14. Where are most of your suppliers located (all materials)?

	1st only		*2nd only*	
	Frequency	**Percent**	**Frequency**	**Percent**
Local (neighboring counties)	38	21.4%	5	3.6%
Michigan wide	50	28.2%	29	21.0%
Midwest states	34	19.2%	41	29.7%
Other regions in the U.S	16	9.0%	20	14.4%
Nationwide	34	19.2%	29	21.0%
Worldwide	5	2.8%	14	10.1%
Total	177	99.8%	138	99.8%

**Total percentages do not equal 100% due to rounding*

15. Do you export to other countries?
16. Do you have customers in Canada?
17. Do you have suppliers in Canada?
18. Do you export to Mexico?

	Yes		*No*	
	Frequency	**Percent**	**Frequency**	**Percent**
Do you export to other countries? (N=182)	137	75.3%	45	24.7%
Do you have customers in Canada? (N=183)	134	73.2%	49	26.8%
Do you have suppliers in Canada? N=180	71	39.4%	109	60.6%
Do you export to Mexico? (N=180)	99	55.0%	81	45.0%

II. Employment and Training Information

1. Number of employees currently employed in Michigan

	How many?
Number of employees currently employed in Michigan	27001
Of that, number employed in: Professional	4,450
Trades	2,758
Semi-skilled	10,735

2. Do you plan to employ additional workers in the next year in Michigan?

	Yes		No		How many?
	Frequency	Percent	Frequency	Percent	
Entry level (N=172)	136	79.1%	36	29.9%	1,709
Skilled level (N=146)	100	68.5%	46	31.5%	452
Professional level (N=142)	85	59.9%	57	40.1%	298
				Total	2,459

By Employee Size

Employee	Unknown		1-19		20-64		65-199		200+	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Entry Level N=172	6	3	27	18	33	5	36	4	34	6
Add. Workers	47		60		172		377		1053	
Skilled Level N=146	6	2	16	19	19	11	30	7	29	7
Add. Worker	11		30		46		85		280	
Professional Level N=142	1	4	8	22	17	12	30	11	29	8
Add. Worker			10		21		70		197	

3. How do you fill job openings? (Check all that apply, but rank top two, 1st and 2nd)

Entry Level
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
MESC	67	36.2%	9	4.8%	11	14.6%
Private employment agency	70	37.8%	19	10.2%	19	10.2%
Other business	22	11.9%	3	1.6%	1	0.5%
Internship/high schools	43	23.2%	5	2.7%	6	3.2%
2- or 4-year colleges	36	19.4%	5	2.7%	6	3.2%
Newspaper ads	116	62.7%	68	36.7%	27	14.9%
Referrals	119	64.3%	29	15.7%	35	18.9%
Walk-in applications	107	57.8%	26	14.0%	42	22.7%
Other	9	4.8%	5	2.7%	1	0.5%

Other:

- Temporary Ad. (2)
- Immigrant groups
- Macomb county on-job training
- Apprenticeship

Skilled Operation/Maintenance
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
MESC	42	22.7%	2	1.0%	7	3.7%
Private employment agency	41	22.1%	12	6.4%	16	8.6%
Other business	23	12.4%	2	1.0%	5	2.7%
Internship/high schools	24	12.9%	2	1.0%	6	3.2%
2- or 4-year colleges	35	18.9%	4	2.1%	3	1.6%
Newspaper ads	101	54.5%	78	42.1%	15	8.1%
Referrals	95	51.3%	29	15.7%	34	18.3%
Walk-in applications	68	36.7%	5	2.7%	25	13.5%
Other	11	5.9%	5	2.7%	2	1.0%

Other:

- Temporary Ad.(2)
- Internal (2)

4. Which types of training does your company use?
(Please rank by importance - least important = 1 to most important = 3)

	Least Important	*Important*	*Most important*	*Total*	
	Frequency	**Frequency**	**Frequency**	**N**	**Mean**
In house	80	14	75	169	1.97
Community College Course	40	70	26	136	1.90
Proprietary	39	47	35	121	1.97

5. In what areas do you feel your business could be assisted by training?
(Rank top two, 1st and 2nd)
N=185

	1st only		*2nd only*	
	Frequency	**Percent**	**Frequency**	**Percent**
ISO 9000	52	29.1%	24	12.9%
School-to-Work Programs	38	20.5%	20	10.8%
Production technologies	54	29.1%	32	17.2%
Teamwork skills	42	22.7%	35	18.9%
Waste reduction	11	5.9%	19	10.2%
CAD/Design	16	8.6%	17	9.1%
Other	3	1.6%	5	2.7%

Other:

- Computer
- TQM (Total Quality Management)
- CNC programming
- On the job training
- Specific job related skills
- Basic skills (We have difficulty finding people who can read/write)

Engineering Position
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
MESC	14	7.5%	2	1.0%	3	1.6%
Private employment agency	54	29.1%	20	10.0%	20	10.0%
Other business	33	17.8%	4	2.1%	7	3.7%
Internship/high schools	15	8.1%	3	1.6%	3	1.6%
2- or 4-year colleges	53	28.6%	19	10.3%	13	7.0%
Newspaper ads	85	45.9%	49	26.4%	24	12.9%
Referrals	82	44.3%	22	11.9%	28	15.1%
Walk-in applications	23	12.4%	1	0.5%	3	1.6%
Other	6	3.2%	2	1.0%		

Other:

- Ad. in trade publications
- Internal (2)
- Self-develop
- in-house promotion
- With-in organization

Supervisors/Managers
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
MESC	19	10.3%	3	3.7%	7	3.7%
Private employment agency	58	31.3%	22	11.9%	26	14.0%
Other business	30	16.2%	5	2.7%	5	2.7%
Internship/high schools	9	4.8%	3	1.6%		
2- or 4-year colleges	35	18.9%	2	1.0%	11	5.9%
Newspaper ads	90	48.6%	60	32.4%	20	10.0%
Referrals	94	50.8%	30	16.2%	27	14.6%
Walk-in applications	24	12.9%	1	0.5%	8	4.3%
Other	16	8.6%	6	3.2%	4	2.1%

Other:

- Internal
- Ad. in trade publications
- In-house promotion

III. Business Environment in Michigan

1. Which of the following do you consider the most important challenges facing Michigan's plastic products industry and/or your company?
(Check all that apply, but rank top two 1st and 2nd)
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
Utility costs	82	44.3%	17	9.1	9	4.8%
Finding skilled employees	117	63.2%	90	48.6	27	14.6%
Upgrading/Training current employees	93	50.2%	21	11.4	41	22.1%
Competing with lower cost regions	83	44.9%	38	20.5	31	16.7%
Foreign competition	40	21.6%	3	1.6	21	11.3%
Educational system	84	45.4%	11	5.9	21	11.3%
Other	7	3.7%	4	2.1	1	0.5%

Other:

- Taxes (SBT) (3)
- Substance abuse
- Health care cost
- Workers compensation Law/Regulation
- Regulation/environmental requirements, costs, constraints
- Federal regulations
- Finding workers - unskilled
- From Auto company - collecting account's receivable

2. What is the most positive aspect of doing business in Michigan?
(Check all that apply, but rank top two 1st and 2nd)
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
Qualified workers	47	25.4%	21	11.3%	9	4.8%
Property tax cuts	29	15.7%	9	4.9%	7	3.7%
Strong economy	94	50.8%	48	25.9%	40	21.6%
Educational system	28	15.1%	1	0.5%	8	4.3%
Access to markets	100	54.0%	67	35.1%	37	2.0%
Transportation infrastructure	59	31.9%	5	2.7%	19	10.2%
Low-cost utilities	13	7.0%	3	1.6%	4	2.1%
Other	8	4.3%	3	1.6%	5	2.7%

Other:

- Previously established headquarters site is located here
- Technology available
- Nice place to live
- Customer location
- Quality of life
- Funding
- Cost of labor

6. Estimate how much you spend annually on training?

N=171

	Frequency	Percent
$1 - 20,000	99	57.9
$20,000 - 50,000	39	22.8
$50,000 - 100,000	13	7.6
More than $100,000	20	11.7

by Company Employee Size

Employee Size	**Unknown**		**1-19**		**20-64**		**65-199**		**200+**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1-20,000 **N=99**	6		41		27		20		5	
20,001 - 50,000 **N=39**	2		3		9		16		9	
50,000 - 100,000 **N=13**							4		9	
More than 100,000 **N=20**					1		1		18	

7. Do you have difficulty finding skilled workers?

	Yes		No		How many openings?
	Frequency	Percent	Frequency	Percent	
Entry level (N=167)	115	68.9	52	31.1	944
Skilled Oper/Main. (N=160)	129	80.6	31	19.4	233
Engineering position (N=138)	88	63.8	50	36.5	127
Supervisors/Mngr. (N=142)	93	65.5	49	34.5	123
				Total	**1,427**

3. What is the most negative aspect of doing business in Michigan? (Check all that apply, but rank top two 1st and 2nd)

N=185

	ALL		1st		2nd	
	N	**%**	**N**	**%**	**N**	**%**
Zoning & property rights issues	31	16.7%	6	3.2%	6	3.2%
Utility costs	64	34.5%	17	9.1%	6	3.2%
Environmental regulations	74	40.0%	18	9.7%	17	9.1%
Transportation infrastructure	17	9.1%	3	1.6%	2	1.0%
Dependence on automotive Industry	66	35.7%	21	11.3%	16	8.6%
State Governmental regulation	66	35.7%	18	9.7%	14	7.5%
Workers' compensation	117	63.2%	50	27.0%	33	17.8%
Unemployment insurance	86	46.4%	16	8.6%	32	17.2%
Taxes	107	57.8%	48	25.9%	27	14.6%
Other	9	4.9%	7	3.7%	2	1.0%

Other:

- SBT (4)
- Weather
- Higher costs to do business in MI than other state
- Lack of employable people
- Research & Development
- Union activity
- Federal regulations
- Skilled workers (6)
- Wage rate

4. Is your firm involved in:

	Yes		No	
	Frequency	**Percent**	**Frequency**	**Percent**
Local School-to-Work Prog. (N=177)	54	30.5	123	69.5
Internship (N=178)	72	40.4	106	59.6

by Employee Size

Employee	Unknown		1-19		20-64		65-199		200+	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Local STW Program N=177	2	7	4	41	11	30	18	24	19	21
Internship N=178	2	5	4	42	12	29	24	19	30	11

IV Assistance

1. **Does your firm currently have access to / use the World Wide Web?**

	Frequency	Percent
Yes	88	48.4%
No	94	51.6%
Total	182	100%

2. **What type(s) of information on the Web would be most useful to you?**
(Check all that apply and rank top two, 1st and 2nd)
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
Plastics Roundtable news/newsletter	75	40.5%	7	3.7%	10	5.4%
Upcoming Plastics Roundtable events and conferences	64	34.5%	5	2.7%	6	3.2%
Information on economic development and workforce programs of benefit to plastics rims	84	45.4%	32	17.3%	9	4.8%
Identification of and links to other plastics Web sites	59	31.8%	13	7.0%	10	5.4%
Technical info on (new) process, materials or equipment/university research and institutes	91	49.1%	31	16.8%	24	12.9%
A plastics bulletin board or "newsgroup to exchange information and comments	69	37.2%	10	5.4%	20	10.9%
Access to technical experts for problem-solving	91	49.1%	37	20.0%	32	17.2%

4. In what area do you feel that university technical assistance could assess your business?
(Check all that apply, but rank top two 1st and 2nd)
N=185

	ALL		1st		2nd	
	N	%	N	%	N	%
Technical (shop floor) efficiencies	103	55.6%	76	41.0%	25	13.5%
Recycling	45	24.3%	6	3.2%	12	6.4%
Marketing	62	33.5%	17	9.1%	26	14.0%
Exporting	39	21.0%	9	4.8%	11	5.9%
New product/material development	102	55.1%	45	24.3%	46	24.9%
Other	5	2.7%	2	1.0%	1	0.5%

Other:

- We have tried working with the university and have found no interest from them.
- Apprenticeship
- Finance
- Workforce

3. Are you considering investment in or expansion of YOUR facilities? If yes, are you considering Michigan expansion or investment? Are you considering expansion outside Michigan?

	Yes		No	
	N	%	N	%
Are you considering investment in or expansion of YOUR facilities? (N=171)	128	74.9%	43	25.1%
If yes, are you considering Michigan expansion or investment? (N=135)	120	88.9%	15	11.1%
Are you considering expansion outside Michigan? (N=145)	54	37.2%	91	62.8%

By Employee Size

	Unknown		1-19		20-64		65-199		200+	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
investment or expansion of your facilities N=171	9	2	26	16	31	6	30	10	32	9
Michigan expansion or investment N=135	9	1	25	6	31	2	29	0	26	6
expansion outside Michigan N=145	3	6	5	29	10	26	14	15	22	15

V. Value-added production

One of the ways to increase employment in the plastic products industry in Michigan is through increased value-added production and the identification of new uses, new compounds, and new markets, e.g., using auto-related plastic technology to produce furniture industry products.

What types of plastics production processing do you think hold the most promise for the Michigan Plastics Industry to expand by adding value to our plastic products?

- New diversified products which are not dependent on the auto industry.
- Fabrication, decorating, and assembly.
- Generally areas involving added value, i.e. assembly, paint/finishing. etc.
- Unsure at this time.
- Plastic reclamation science. Furnish scholarships or grants for Masters & Ph.D. programs to pursue the best brains available to develop economically competitive processes.
- Don't know.
- Injection molding of engineering grade plastics and thermos plastic elatomers.
- Please! send results of this survey for our STW program & curriculum development. Thanks
- With newer technologies we need trained people. Increasing employment in Michigan is not the problem. attracting people to Michigan is. the level of people (unskilled) that are necessary to work in MFG. Don't move from southern states to northern. Therefore, wages in MFG down south are lower and unemployment was high. We do not have access to those types of resources and with the increase to the minimum wage we have a difficult time competing against companies not in our industry. Automation is not the answer because you pay higher wages for skilled workers and you've increased debt. Unskilled workers are just as important as skilled.
- Nondurable consumer goods - must get away from our dependence on auto industry!
- We are open to ideas and suggestions possible promising situations would be recycling we are willing o share our 100' combined years of experience with others.
- Plastic compounding, film & fiber, and Thermos forming.
- We need to expand into consumer products, computer industry, industrial products, so we auto suppliers can have a more even balance in products produced. This will take the ripples out of our business when automotive slows down.

- Formed plastics for structural components with less material content.
  Biodegradable plastics
  Surface treatments for hardness, UV protection, toughness.

- Injection molding and blow molding.

- Injection molding and Thermoforming

- Use auto technology to produce: water craft products, snow-leisure toys, and snow-industrial use products.

- We are thermoforming mold makers - look like all our industry expansion is heading south and west. - taxes, energy costs less expensive.

- Technical products. Utilizing advanced materials and processes developed for auto, molding for products in other markets, i.e., construction housewares, packaging, furniture, computers, etc.

- In-molding decorating, mold-in-color materials (eliminate painting), and co-injection molding

- Since Michigan is automotive oriented, it is obvious that more use of plastics in the automobile, in plastic parts, and plastic materials handling. Trays, boxes, bins, pallets, no only for shipping parts, but for in house use also. However, I realize that a very high percentage of material handling is already done with plastic, and there may not be that much room for expansion. Therefore the replacement of metal parts with plastic parts in the vehicles themselves, will have to become much greater, if the plastics industry is going to continue to experience much growth. as the quality of the resin's continues to rise, I'm sure the auto industry will find more use for plastic, and will prosper in doing so.

- Alloying and/or compounding of automotive scrap special materials into useable materials for less demanding automotive and non-automotive applications.

- 1) Low cost, high volume, semi-continuous production of composite materials and parts via pultrusion, filament winding, pre-pressing, etc. 2) Joint/cooperative development of materials & processing equipment -- match the two and tailor to each other. 3) Recycling of automotive/vehicle waste or scrap into non-automotive applications such as materials for highway construction. Needs to be supported by state (Michigan Highway Commission). There is a need (improve/repair Michigan roads), low cost raw materials (scrap/recycled plastics from auto), and technology resources (state universities and associated institutions like polymer institute at University of Detroit Mercy and corporations like Dow, BASF, and others)

- Retail consumer products, Pumps and housings, clamps and fittings, fasteners, and electronic products including automotive.

- Recycling

- Insert molding and in process decorating. This means added value for the plastics processor and cost savings potential for the OEM's

- Rapid prototyping

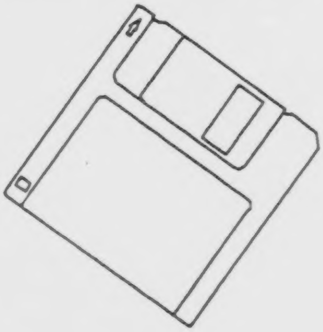
- Environmental based products and computer products (case, housing, etc.)
- Gas-assist or gas counter pressure processing which allows solid parts to be molded without cycle time penalties.

- Injection molding/extrusion of plastics should continue to be a strong production process for Michigan's plastics industry.

Stephens'

ELECTRONIC PLASTICS DIRECTORIES

for Windows



Industry Services

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Michigan Plastics Industry Roundtable
Data Base Summary

COUNTY	COMPANIES	EMPLOYEES	KEY PLAYERS
Oakland	220	19,243	Cadillac, Handy, ITT, Woodbridge, Libralter
Macomb	170	18,066	Aeroquip, Auto, Crown, Ford, Venture
Kent	162	19,815	Amway, Cascade, Lacks, Lescoa
Wayne	148	8,517	Cambridge, Ford, Plastipak
Ottawa	57	8,200	Afco, Batts, Donnelly, Prince
Kalamazoo	49	4,498	Summit
St. Clair	36	3,689	BWP, Huron
Washtenaw	31	7,094	Ford
Berrien	29	2,403	Modern, Wollin
Genesee	27	1127	Vemco
St. Joseph	25	2,132	Lear, Sturgis
Ingham	24	4,800	BOC, Dart
Saginaw	20	1,305	Thompson
Calhoun	20	1,116	
Livingston	19	1,325	
Grand Traverse	18	1,365	Nish
Bay	17	912	
Lenawee	15	1,680	Inland
Muskegon	15	662	
Sanilac	14	701	
Jackson	14	1,162	Aeroquip, Wolverine
Shiawassee	14	1,154	
Cass	12	466	
Lapeer	11	2,047	Voplex, Albar, Durakon
Charlevoix	10	618	Lexamar
Ionia	10	1,314	GenCorp, Atron
Midland	9	11,476	Dow
Van Buren	9	1,177	Inverness, EPC
Iosco	8	528	ITT
Tuscola	8	378	
Gladwin	7	429	Brown
Gratiot	7	1,357	UT
Huron	7	335	
Montcalm	7	504	
Monroe	7	176	
Clare	6	380	

COUNTY	COMPANIES	EMPLOYEES	KEY PLAYERS
Eaton	6	240	
Wexford	5	2,277	Cadillac, Winns
Branch	4	507	Solvay
Crawford	4	42	
Emmet	4	329	
Hillsdale	4	554	Mark
Otsego	4	155	
Barry	3	161	
Houghton	3	50	
Manistee	3	149	
Osceola	3	930	Evart
Isabella	2	97	
Ogemaw	2	121	
Baraga	2	37	
Alpena	1	250	
Clinton	1	1	
Missaukee	1	37	
Newaygo	1	5	
Presque Isle	1	85	
Dickinson	1	130	
Menominee	1	15	
Gogebic	1	80	
Montmorency	1	11	
Cheboygan	1	13	
TOTALS	1321	138,427	

Sort Codes

AS	Assembly
AU	Automotive plastic products
BG	Bags
BM	Blow Molding
CF	Cellulose fiber
CM	Compression molding
CN	Containers; bottles
CP	Compounding; color additives; mixing
CS	Composites
CT	Coatings
DF	Design; finishing; decorating
DS	Distributor
EM	Extrusion molding
FB	Fabricating; cutting; shaping; forming
FG	Fiberglass
FL	Film
FM	Foam
GS	Gaskets
HS	Hot stamping
HT	Hoses, tubing
IM	Injection molding
IS	Insert molding
LM	Laminating
ME	Machinery & equipment

MP	Molded parts
NY	Nylon
PE	Polyethylene
PK	Packaging
PL	Plastic parts (non-automotive)
PP	Plastic pipe
PR	Prototypes
PS	Polystyrene; styrene
RA	Raw materials; chemicals
RC	Recycling; reprocessing
RM	Reaction injection molding (RIM)
RN	Resins
RO	Rotational molding
RS	Research
RT	Resin transfer molding
SH	Sheet; extruded sheet
TD	Tools; dies; molds; machining; fixtures; job shops
TH	Thermoforming
TL	Testing; laboratories
TP	Thermoplastics
TS	Thermosets
UR	Urethane
VU	Vacuum forming
VY	Vinyl

MICHIGAN JOBS TEAM

Economic Development Job Training Program

The Economic Development Job Training (EDJT) Program, administered by the Michigan Jobs Commission, helps Michigan businesses create new jobs or retain existing jobs which are at risk, by improving the skills and competitiveness of Michigan's workforce.

Competition often forces employers to seek locations where a skilled and trained labor force is available. Customers demand products and services for lower prices but of higher quality. Successful Michigan companies are responding by re-engineering and streamlining their processes and increasing the skill levels of their workforce. Where existing resources are not adequate to support this skill training, this program provides funds for training persons 16 years of age and older who need additional or improved workplace skills in order to obtain or retain a job and ensure a highly competitive workforce. This program is targeted to business sectors which will have the highest economic impact on the State of Michigan.

Eligibility

Any Michigan business which agrees to create jobs or retain jobs at risk of being lost, paying $7 per hour or more, in manufacturing, research and development, warehousing and distribution, a world headquarters, or a business which exports goods and services outside Michigan is eligible to receive education and training services funded by this program.

The following entities which deliver these education or training services are eligible to apply for these competitive grants on behalf of specific employers:

- Public school districts
- Intermediate school districts
- Community colleges
- Public or private non-profit colleges or universities
- Charter schools
- Non-profit organizations which provide school-to-work transition programs, employment and training services, vocational rehabilitation programs, or state licensed accredited vocational or technical education programs
- Proprietary schools licensed by the State Board of Education
- A local workforce development board
- A consortium consisting of any of the above applicants

Partnerships

The Economic Development Job Training Program is designed to foster capacity building with training providers and link with local school-to-work efforts. The program serves as a catalyst stimulating close working relationships between local training providers, employers, economic development organizations, local Michigan Works! Agencies, MESC branch offices, and Michigan Jobs Commission. The program also builds upon the network of existing private sector and community resources to ensure that customized and coordinated training programs are available to either individual or multiple employers.

(more)

Requirements

Funded applications must show a specific employer need for the worker training, a written commitment from the employer to hire or retain the workers after completion of training, and training for full-time jobs of sufficient skill, wage, and benefit level to warrant training costs.

Employers must provide a 25 percent match for training existing workers. Additional employer cash or non-monetary contributions to worker training are encouraged.

EDJT funds must not supplant other available funds. Grant applicants must coordinate with the local workforce development board and other potential sources of job training funds, particularly for the training of new workers.

Application Process

Grants are awarded following a two-stage, competitive application process. Applicants that pass the pre-application review are invited to submit a full grant application. Each training proposal is competitively scored based on its merits. Pre-applications and full grant applications will be continuously accepted throughout the year until funding is exhausted.

Priority For The Award Of Grants

This grant award process is competitive. Proposals which most effectively address all of the following factors will receive priority for the award of Economic Development Job Training grants by the Michigan Jobs Commission:

- Demonstrated need for the type of training offered, prospects and strength of commitment for participant job placement or job retention and for strengthening the state's economic base
- The average state unemployment rate for the 12-month period immediately preceding application, for the city, township, village, or municipality in which the business organization is located
- Number of unemployed persons, unemployed persons with disabilities, and the number of persons at risk of becoming unemployed, to be trained in the program
- Qualifications of the project director and key personnel, availability of appropriate classroom space, materials, and equipment, applicant training history, and program evaluation plan
- Cost per participant and participant contact hours of training
- Collaboration with appropriate community and business organizations and extent to which the proposal maximizes other federal, local, private, or in-kind financial contributions
- Employer training history
- Guarantee to employer that trainees who successfully complete program will be able to adequately perform the intended job or additional training will be provided at no additional cost

For More Information

For more information about the Economic Development Job Training Program, contact the Michigan Jobs Commission at (517) 373-9808.

MICHIGAN JOBS COMMISSION

Economic Development Job Training (EDJT) Program

1. Company Identifies Need for Training

2. Company Contacts Training Provider

3. Training Provider Prepares EDJT Pre-Application With Company Assistance and Jobs Commitment

4. Michigan Jobs Commission Approves Pre-Application
    - Pre-Application Complete
    - Eligible Applicant
    - Economic Impact

5. Training Provider and Company:
    - Determine Specific Skill Needs
    - Develop a Training Plan
    - Develop a Training Budget
    - Submit a Grant Application

6. Michigan Jobs Commission Approves Grant to the Training Provider
    - Application Complete
    - Competitive

7. Training is Done and Grant Payments Are Made:
    - Upon Grant Approval
    - After Completion of Training
    - After Trained Workers Are On the Job for 12 Weeks

MICHIGAN JOBS COMMISSION

MICHIGAN JOBS TEAM

John Engler, Governor

Doug Rothwell, Chief Executive Officer
and Department Director

August 9, 1996

Dear Eligible Applicants and Interested Parties:

The Michigan Jobs Commission is pleased to announce the 1996-97 Economic Development Job Training Program. Enclosed are application materials and instructions for the 1996-1997 program. These materials have been prepared by the Michigan Jobs Commission, in accordance with Public Act 351 of 1996, and modified following public notice, review and comment.

If you did not receive these materials by mail, you may wish to be added to our mailing list. Please contact:

Michigan Jobs Commission
Economic Development Job Training Program
Victor Office Center, First Floor
201 North Washington Square
Lansing, Michigan 48913
(517) 373-6508

Please note that there are a number of changes from last year, including:

- Reduction in paperwork required of employers to support a grant proposal.
- Incentives and priorities in support of small business participation.
- Simplification of the grant payment schedule.
- Additional guidance for troublesome areas identified by applicants and employers, such as acceptable types of training, identification of a source for curriculum content, and identification of other sources of funding.
- Identification of local workforce development boards for training program coordination.

The application process for this program is statutorily prescribed. The Michigan Jobs Commission will continue to seek ways to simplify and improve the application materials for this program. Your input and suggestions are welcome.

These application materials and instructions should only be used for the 1996-97 program. Pre-Application materials may be submitted to the Michigan Jobs Commission, Economic Development Job Training Program, beginning August 9, 1996.

Sincerely,

213

Douglas E. Stites
Chief Operating Officer

Enclosures

201 N. Washington Square ◆ Victor Office Center — 1st Floor ◆ Lansing, MI 48913 ◆ *Tel* (517) 373-6508 ◆ *Fax* (517) 373-8179
Michigan Relay Center 1-800-649-3777 (Voice and TDD)

The Michigan Jobs Commission is an equal opportunity employer/program. Auxiliary aids and services are available upon request to individuals with disabilities.

Michigan School-to-Work Resources

Section III-B:
School-to-Work in Michigan

- Michigan has a well-developed school-to-work system throughout the state especially in the traditional "voc-tech" areas. More needed programs are being implemented in general business careers, manufacturing technology, and of course, **plastics**. The Michigan School-to-Work Clearinghouse homepage describes the assistance provided by MJC and the Michigan Department of Education. The Michigan School-to-Work Initiative summary provides essential background information including its six main objectives.

- The School-to-Work Partnership Contacts is an up-to-date list of experts in each school district throughout the state. This may be a good **first contact for plastics businesses** wishing to get a partnership started.

- As of October 1, 1996 authority over STW funds has been transferred to 26 Workforce Development Boards. A complete Directory is enclosed, which may be a good **second contact** for plastics businesses, or simply call **1-800-285-WORK** to reach a local board.

- The Michigan Chamber of Commerce has published Getting it Done: An Education Reform Workbook for Michigan Business Leaders. Included here is the contents page and introduction to show the scope and importance of the book. Contact the web site at **http://www.michamber.com**.

- One of the goals of the Plastics Roundtable was to assess the extent of post secondary education for plastics. To that end a survey was conducted and information collected on 13 plastics programs throughout the state. The Executive Summary describes the process and presents the results of the survey. The MPIR Survey of Higher Education provides details for each college. Where available, copies of the plastics programs are included.

- A map of Michigan's Community Colleges provides the big picture.

- Also included is an excellent article The Role of Postsecondary Institutions in School-to-Work.

School-to-Work

The Michigan Jobs Commission and the Michigan Department of Education are making available assistance for local community partnerships to develop plans for the implementation of a school-to-work system that will help youth acquire the knowledge, skills, abilities, and labor market information they need to make a smooth and effective transition from school to career-oriented employment or to further education or training. This assistance is to be used as "venture capital" to stimulate local creativity in establishing systems that build on and enrich promising programs such as tech prep education school-to-apprenticeship, cooperative education, business-education compacts, and career academies or charter schools.

MCCTE Home

If you have questions about our School-to-Work programs, contact Tim Jackson. For questions about the web site, contact Noel Estabrook

NEW!

- ☐ School-to-Careers.com
- ☐ Information on the STW Newsletter
- ☐ The Occupational Information Network
- ☐ Occupational Outlook Handbook
- ☐ Technology Spotlight on Future Employment Trends (by state)

Other Areas

- ☐ School-to-Work Resources and Related Links
- ☐ Michigan Technical Assistance Resource Bank
- ☐ Michigan School-to-Work Partnership Contacts
- ☐ Michigan Labor Market Areas (LMAs) Information
- ☐ Upcoming Events

Funded by:

US Department of Education and Labor.

School-to-Work Office
Michigan Jobs Commission
517.373.6432

Michigan School-to-Work Clearinghouse
Voice 1.800.292.1606 (Toll free from Michigan)
517.353.4397
Fax: 517.432.2931

| Home | Top Of Page | Go Back | Search |

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School-to-Work Partnership Contacts

Please feel free to contact any of these people for more information. If you have E-Mail or Internet information on any of them, please tell us.

Catherine Burton-Snell
c/o Allegan County ISD
310 Thomas Street
Allegan, MI 49010
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Fax 616-686-0327

Roger Witherbee
c/o Alpena-MontmorencyAlcona ESD
2118 U.S. 23 South
Alpena, MI 49707
Ph. 517-354-3101
Fax 517-356-3058

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c/o Berrien County ISD
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c/o Lewis-Cass ISD
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Fax 616-445-2981

Naomi Singer

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Fax 517-275-5881

Gayle DeShambo
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Fax 906-786-9318

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Theodore Pacquin
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Kingsford, MI 49801
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Richard Dodge
Genesee ISD
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Ithaca, MI 48847-0310
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111 Pearl N.W.

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Ph. 517-265-1612
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Livingston County Job Training Services
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Howell, MI 48843
Ph. 517-546-7450
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Mary Polcin
c/o Mason - Lake ISD

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c/o Monroe County ISD
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Fax 313-242-0567

Scott Crosby
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1550 W. Sidney Rd.
Sidney, MI 48885
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Fax 517-328-2000

Wendy Ohst or Paul Roy, Jr.
c/o Muskegon-Ocean Consortium
20 W. Muskegon Ave.
Muskegon, MI 49440
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Fax 616-724-6687

Barbara Dursen
c/o Oakland Schools
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Fax 810-858-2024

Sandra Dupuis
Ottawa STW Partnership
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Patricia Graves
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Fax 810-364-8139

Bernie Stankewicz
c/o St. Joseph County ISD
62445 Shimmel Road
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Connie Riopelle
c/o N.W. MI Tech Prep Consortium
STW Partnership
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Fax 616-922-6325

Robert Hirn
Tuscola ISD
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Fax 517-673-4228

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Fax 616-674-8954

Vivian D. Lyte
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E-mail: vlyte@v.imap.itd.umich.edu

Halyna Bialczyk
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Donald Heikkila
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Hancock, MI 49930
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Fax 906-482-1931

Tim Knaggs
c/o Wexford-Missaukee ISD
9901 East 13th St.
Cadillac, MI 49601
Ph. 616-779-8500
Fax 616-779-0071

HOME PAGE TECH PREP [redacted]

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DIRECTORY

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MICHIGAN WORKS!™

2500 Kerry Street, Suite 210
Lansing, Michigan 48912-3657
(517) 371-1100 • FAX (517) 371-1140
miworks1@aol.com

Equal Opportunity Employer/Program

Funding Source: Michigan Jobs Commission

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[redacted]

Michigan Works! is recognized nationally as the largest and most progressive workforce development association in the country. It was established in 1987 to foster high-quality employment and training programs by providing support activities and a forum for information exchange for Michigan's workforce development system.

Through the association, members are able to maximize communication among workforce development professional across the state, coordinate efforts on statewide projects, kee legislators and others informed on workforce development issues and receive important technical assistance and staff training to ensure high-quality programming and service delivery. There are 26 local Michigan Works! agencies offerin workforce development services in every area of the state.

Through its public information, training, technical assistance and marketing activities, Michigan Works! provides importa services to its members:

Communication Network—Michigan Works! has a hi effective network of communication and informa exchange which enables the agencies to be heard at all levels of decision making.

Staff Training—Michigan Works! provides over 1,100 hours training annually. Each year over 2,500 people attend th association's workshops, forums and customized orientations.

On-site Technical Assistance—Michigan Works! provides important on-site technical assistance and "trouble-shooting" on a variety of issues, including management information systems, cost allocation and procurement.

Publications and Special Events—Michigan Works! produce a quarterly newsletter (*Newsline*), issue papers and legislative updates. Special events include a conference, which is attended each year by approximately 500 professionals, and an annual alumni celebration recogni ing outstanding achievement by program participants.

[redacted]

Workforce development is a comprehensive program of preparing people for good jobs so that employers have the skilled workers they need to be competitive in our global economy. In Michigan, workforce development *is* economic development.

Workforce development programs are administered locally through Workforce Development Boards (WDBs), appointed by local elected officials. The WDBs are local boards representing the private sector as well as education, social services, labor, community-based organizations and other groups affecting workforce development in a community.

Through this private-public partnership, Michigan's workforce development system—Michigan Works!—delivers programs in four essential areas: **School to Work, Welfare to Work, Unemployment to Work** and **Work to Work** to meet the unique needs of each community.

The Governor, through the Michigan Jobs Commission (MJC), provides administration and oversight of programs at the state level. The Governor's Workforce Commission, composed of representatives of the private sector, education, human services, labor, community-based organizations and others, advises the Governor and the MJC on general goals and overall workforce development policies for the state.

[redacted]

Local Michigan Works! agencies offer a wide variety of programs designed to prepare youth and unskilled adults for entry into the labor force and to help individuals who are disadvantaged or who face serious barriers to employment obtain the training necessary to get and keep a job.

These programs include:

Adult Programs, including classroom training, on-the-job training, remedial education, job search assistance and supportive services.

Year-Round Youth Programs, including the same services offered in adult programs, as well as alternative high school services, school to work transition, pre-employment and work maturity skills training and support services.

Summer Youth Employment and Training Programs, provi ing job opportunities, work experience and remedial education to disadvantaged youth during the summe months.

State Education Coordination Grants, funding literacy training, dropout prevention, programs for hard-to-se adults and dropouts, as well as programs to promote long learning and place women in non-traditional employment. These funds are administered by the Michigan Department of Education.

Programs for Older Workers, offering specialized training individuals who are 55 and over.

Training Programs and Readjustment Services for Disloca Workers, including rapid response, skill training and basic readjustment services.

Federally-administered Programs, including Job Corps an programs focusing on special groups (i.e., Veterans, Native Americans and Migrant Workers).

Work First, providing job search assistance and training to Aid to Families with Dependent Children (AFDC) clie referred by the Family Independence Agency.

School to Work Programs, providing assistance to young people in making the transition from high school to g jobs through school-based learning, work-based learn and activities that link the two.

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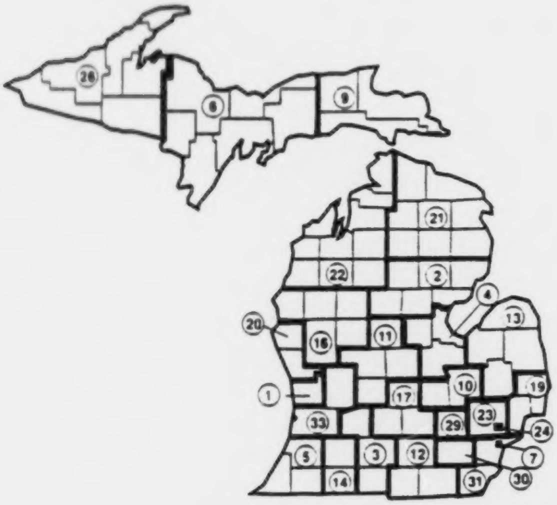
[redacted]

1. Ottawa County Department of Employment and Training
2. Region 7B Employment and Training Consortium
3. Calhoun Intermediate School District
4. Saginaw-Midland-Bay Michigan Works!
5. Berrien-Cass-Van Buren Office of Michigan Works!
6. Six County Employment Alliance
7. City of Detroit Employment and Training Department
9. Eastern Upper Peninsula Employment and Training Consortium
10. JOBS Central, Inc.
11. Central Area Partnership Consortium (CAPC)
12. Hillsdale County Intermediate School District
13. Thumb Area Employment and Training Consortium
14. Kalamazoo-St. Joseph Michigan Works!
16. Michigan Works! West Central
17. Lansing Tri-County Employment and Training Consortium
19. Macomb-St. Clair Workforce Development Board, Inc.
20. Muskegon/Oceana Consortium
21. Northeast Michigan Consortium
22. Northwest Michigan Council of Governments (NWMCOG)
23. Balance of Oakland County Employment and Training Division
24. Greater Pontiac Area Consortium (GPAC)
26. Western Upper Peninsula Manpower Consortium
29. Livingston County Job Training Services
30. Washtenaw County Workforce Development Board/Employment Training and Community Services Group
31. Southeast Michigan Community Alliance (SEMCA) Michigan Works! Affiliate
33. Area Community Service Employment and Training (ACSET) Council



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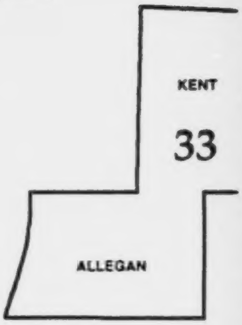
Area Community Service Employment and Training (ACSET) Council



ADDRESS:
144 E. Fulton St.
Grand Rapids, MI 49503

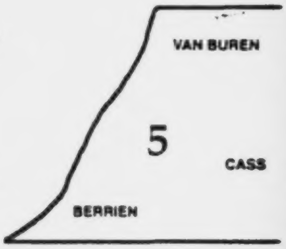
PHONE: 616/336-4100
888/779-7774
FAX: 616/336-4118
DIRECTOR: Beverly Drake
WDB CHAIR: Gordon Reynolds
CEO: John Logie

Balance of Oakland County Employment and Training Division

ADDRESS:
1200 N. Telegraph Rd., #437
Pontiac, MI 48341-0437

PHONE: 810/858-5520
FAX: 810/452-2260
DIRECTOR: John Almstadt
WDB CHAIR: Pamela Berklich
CEO: L. Brooks Patterson

Berrien-Cass-Van Buren Office of Michigan Works!



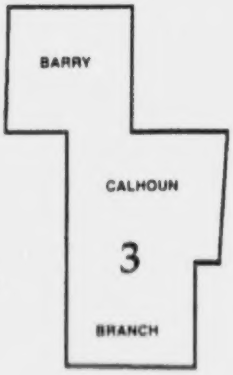
ADDRESS:
Vincent Place, 185 E. Main St.
Benton Harbor, MI 49022

PHONE: 616/927-1064
800/533-5800
FAX: 616/927-1399
DIRECTOR: Shirley Wohler (Interim)
WDB CHAIR: Leo Soorus
CEO: Harry Sarno

Calhoun Intermediate School District

ADDRESS:
17111 G Drive North
Marshall, MI 49068

PHONE: 616/781-5141
FAX: 616/781-8792
DIRECTOR: Roger LaBonte
WDB CHAIR: Dr. Lynne Haley
CEO: Marvin Austin


BARRY
CALHOUN
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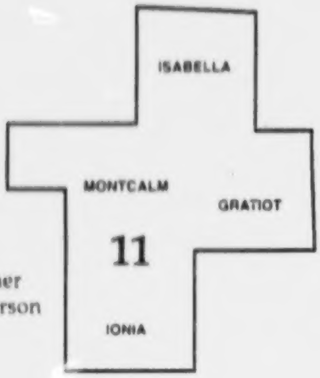
BRANCH

Central Area Partnership Consortium (CAPC)

ADDRESS:
904 Oak Dr. - Turk Lake
P.O. Box 368
Greenville, MI 48838

PHONE: 616/754-9315
FAX: 616/754-9310
DIRECTOR: Ralph Loeschner
WDB CHAIR: Denise Anderson
CEO: Jack Van Harn


ISABELLA
MONTCALM
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City of Detroit Employment and Training Department

ADDRESS:
707 W. Milwaukee, 5th Floor
Detroit, MI 48202

PHONE: 313/876-0674
FAX: 313/876-0686
DIRECTOR: Willie Walker
WDB CHAIR: William C. Brooks
CEO: Dennis Archer

DETROIT ◆
WAYNE
7

Eastern Upper Peninsula Employment and Training Consortium

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2901 I-75
Business Spur
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MI 49783

PHONE: 906/635-1752
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FAX: 906/635-0115
DIRECTOR: Gwen E. Worley
WDB CHAIR: Earl Kay
CEO: Reta Gustafson

LUCE
9
MACKINAC
CHIPPEWA

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Pontiac, MI 48342-2227

PHONE: 810/858-1890
FAX: 810/858-2004
DIRECTOR: Sandra Lee-Spinks
WDB CHAIR: Patrick Lamberti
CEO: Dale A. Stuart

OAKLAND
24
PONTIAC ◆

Hillsdale County Intermediate School District

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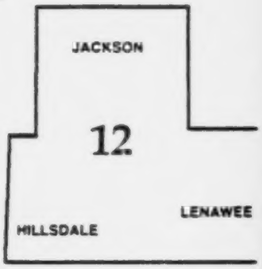
PHONE: 517/437-0990
FAX:
DIRECTOR: Scott Menzel
WDB CHAIR: Beverly Brown
CEO: Amy Brown


JACKSON
12
LENAWEE
HILLSDALE

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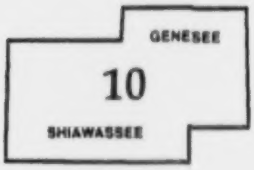
JOBS Central, Inc.


GENESEE
10
SHIAWASSEE

ADDRESS:
711 N. Saginaw St.
Flint, MI 48503

PHONE: 810/233-5974
FAX: 810/233-3238
PRESIDENT: Pamela Loving (Acting)
WDB CHAIR: Ken Hardin
CEO: Vera B. Rison

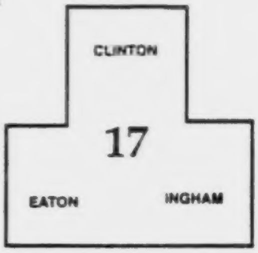
Kalamazoo-St. Joseph
Michigan Works!

KALAMAZOO
14
ST. JOSEPH

ADDRESS:
536 W. Lovell St.
Kalamazoo, MI 49007

PHONE: 616/349-1533
FAX: 616/349-5505
DIRECTOR: Robert A. Straits
WDB CHAIR: Susan Einspahr
CEO: Robert Houtman

Lansing Tri-County Employment
and Training Consortium


CLINTON
17
EATON
INGHAM

ADDRESS:
1850 W. Mt. Hope Ave.
Lansing, MI 48910

PHONE: 517/487-0106, x102
FAX: 517/487-0113
DIRECTOR: Michael A. Quinn
WDB CHAIR: David Schmidt
CEO: Jean McDonald

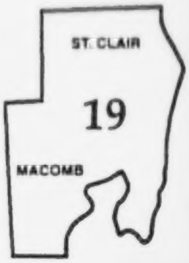
Livingston County
Job Training Services

29
LIVINGSTON

ADDRESS:
828 E. Grand River
Howell, MI 48843

PHONE: 517/546-7450
FAX: 517/546-2353
DIRECTOR: William Sleight
WDB CHAIR: Janet Joseph
CEO: John E. LaBelle

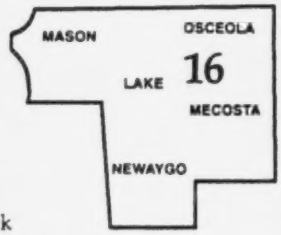
Macomb-St. Clair
Workforce Development Board, Inc.


ST. CLAIR
19
MACOMB

ADDRESS:
VerKuilen Building
21885 Dunham Rd., #11
Clinton Twp., MI 48036-1030

PHONE: 810/469-5220
FAX: 810/469-7488
DIRECTOR: John H. Bierbusse
WDB CHAIR: William Morelli, Sr.
CEO: Diana Kolakowski

Michigan Works! West Central


MASON
OSCEOLA
LAKE
16
MECOSTA
NEWAYGO

ADDRESS:
110 Elm St.
Big Rapids, MI 49307

PHONE: 616/796-4891
800/442-8521
FAX: 616/796-8316
DIRECTOR: Paul J. Griffith
WDB CHAIR: William Stanek
CEO: Larry Emig

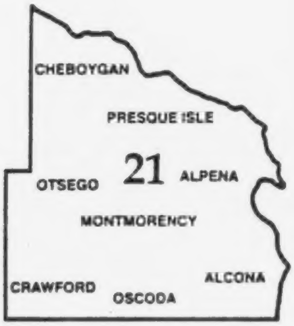
Muskegon/Oceana Consortium

OCEANA
20
MUSKEGON

ADDRESS:
20 W. Muskegon Ave.
Muskegon, MI 49440

PHONE: 616/724-6381
FAX: 616/724-6687
DIRECTOR: Paul Roy, Jr.
WDB CHAIR: Joy Nelson
CEO: Kenneth Hulka

Northeast Michigan Consortium


CHEBOYGAN
PRESQUE ISLE
OTSEGO
21
ALPENA
MONTMORENCY
CRAWFORD
OSCODA
ALCONA

ADDRESS:
20709 State St.
P.O. Box 711
Onaway, MI 49765

PHONE: 517/733-8548
FAX: 517/733-8069
DIRECTOR: Kurt B. Ries
WDB CHAIR: Betty Kreuger
CEO: William Gilmet

Northwest Michigan Council of Governments (NWMCOG)

EMMET
CHARLEVOIX
ANTRIM
LEELANAU
GRAND TRAVERSE
KALKASKA
BENZIE
WEXFORD
MANISTEE
22
MISSAUKEE

ADDRESS:
2194 Dendrinos Dr.
P.O. Box 506
Traverse City, MI 49684

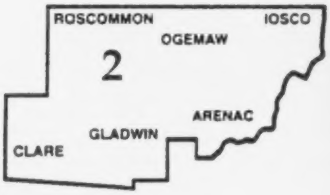
PHONE: 616/929-5000
800/692-7774
FAX: 616-929-5012
DIRECTOR: Bud Shipstead
WDB CHAIR: David R. Adams
CEO: Donald R. Smith

Ottawa County Department of Employment and Training

ADDRESS:
12251 James St., Ste. 300
Holland, MI 49424

PHONE: 616/393-5644
FAX: 616/393-5612
DIRECTOR: Gary Scholten
WDB CHAIR: Doug Peterson
CEO: Cornelius VanderKam

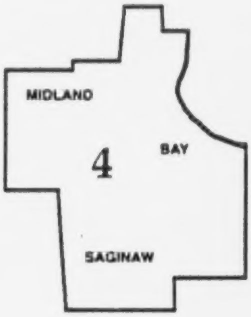
Region 7B Employment and Training Consortium


ROSCOMMON
IOSCO
OGEMAW
2
ARENAC
GLADWIN
CLARE

ADDRESS:
402 N. First St.
P.O. Box 408
Harrison, MI 48625

PHONE: 517/539-2173
888/401-STOP
FAX: 517/539-6053
DIRECTOR: Roberta Volker-Foreman
WDB CHAIR: Ben Harris
CEO: Adolph Presidio

Saginaw-Midland-Bay Michigan Works!


MIDLAND
4
BAY
SAGINAW

ADDRESS:
1600 N. Michigan
Room 400
Saginaw, MI 48602

PHONE: 517/754-1144
FAX: 517/754-1439
DIRECTOR: Dennis Brieske
WDB CHAIR: Jim Heffel
CEO: RoseMarie McQuaid

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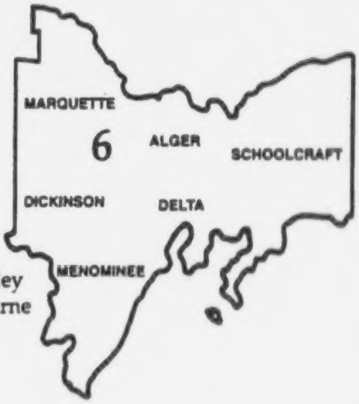
Six County Employment Alliance

ADDRESS:
2831 N. Lincoln Rd.
Escanaba, MI 49829

PHONE: 906/789-9732
800/562-9832
FAX: 906/789-9952
DIRECTOR: Orrin E. Bailey
WDB CHAIR: Willard Carne
CEO: Paul Arsenault

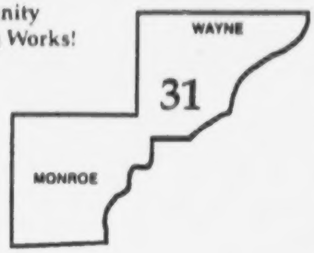

MARQUETTE
6
ALGER
SCHOOLCRAFT
DICKINSON
DELTA
MENOMINEE

Southeast Michigan Community Alliance (SEMCA) Michigan Works! Affiliate

ADDRESS:
8750 S. Telegraph Road
Suite 400
Taylor, MI 48180

PHONE: 313/295-1200
FAX: 313/295-7742

DIRECTOR: John B. O'Reilly, Jr.
WDB CHAIR: Frank Lopez
CEO: Thomas Yack

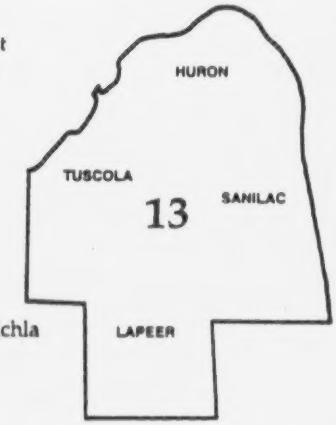

WAYNE
31
MONROE

Thumb Area Employment and Training Consortium

ADDRESS:
3270 Wilson St.
Marlette, MI 48453

PHONE: 517/635-3561
FAX: 517/635-2230

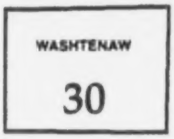
DIRECTOR: Marvin N. Pichla
WDB CHAIR: Ted Sadler
CEO: Cheryl Clark


HURON
TUSCOLA
13
SANILAC
LAPEER

Washtenaw County Workforce Development Board/Employment Training and Community Services Group

ADDRESS:
555 Towner St.
P.O. Box 915
Ypsilanti, MI 48197-0915

PHONE: 313/484-6650
FAX: 313/484-7271
DIRECTOR: Trenda Rusher
WDB CHAIR: Michaela Lazarski
CEO: Grace Shackman

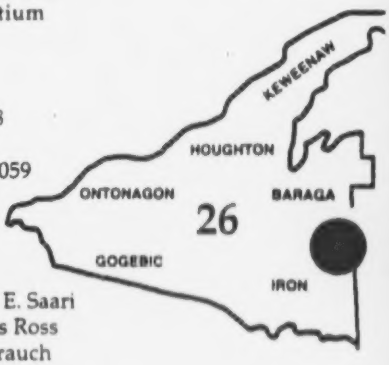

WASHTENAW
30

Western Upper Peninsula Manpower Consortium

ADDRESS:
100 Marquette St.
Ironwood, MI 49938

PHONE: 906/932-4059
FAX: 906/932-3992

DIRECTOR: James E. Saari
WDB CHAIR: Chris Ross
CEO: Frank Stubenrauch


KEWEENAW
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IRON

Michigan Plastics Industry Roundtable
Survey of Higher Education

Executive Summary - November, 1996

An informal survey of higher education for plastics in Michigan was conducted in October of 1996 as one component of the MPIR grant. The information was gathered by telephone with standard interview questions to expedite the results and to increase participation. A total of 32 institutions were contacted, all but three responded. A total of 18 institutions currently have courses in plastics; of those 13 have a plastics "program".

Ferris State University is the only institution that has a Bachelor Degree in Plastics Engineering, graduating about 50 students per year. Other schools have an Engineering Degree with a *concentration* in Plastics: Eastern Michigan University with 10 graduates per year, GMI Engineering Institute with 35 graduates per year, and Western Michigan University with 10 graduates per year. **This makes a total of about 105 Bachelor Degrees per year in plastics.**

In addition, there are five institutions that provide courses in plastics as part of a Chemical or Materials degree program: University of Detroit-Mercy, University of Michigan-Ann Arbor, Wayne State University, Michigan State University, and Michigan Technological University.

There are five colleges in the state that offer Associate Degrees in Plastics: Ferris State University with 70 graduates per year, Grand Rapids Community College with 10 graduates per year, Kalamazoo Valley Community College with 2 graduates per year, Macomb Community College with 1 graduate per year, Oakland Community College (number not provided), and St. Clair County Community College with 10 graduates per year. **This makes a total of about 93 Associate Degrees per year in plastics.**

Several community colleges also provide Certificate Programs in Plastics: KVCC with 2 graduates per year, MCC with 1 graduate per year, and SC4 with 10 graduates per year. The **total is about 13 Certificates per year in Plastics.**

In addition, KVCC and SC4 work with local plastics companies to provide courses for a **Plastics Apprenticeship** program, which may or may not result in a degree. Many colleges offer 1-3 courses in plastics as part of Manufacturing Technology or other program. Hundreds of students across the state take these courses every year either as part of another degree or for specific job training that is not for any degree.

Finally, several colleges such as GRCC, KVCC, and SC4 provide **customized training** courses for plastics companies for both new and experienced employees. See the attached literature for examples.

Central Michigan University

Garry Mesler
Industrial & Engineering Technology
Central Michigan University
Mt. Pleasant, MI 48859
517-774-3950

One introductory course in plastics for the I&ET degree program, about 100 students per year.

C. S. Mott College

Technology Department
C. S. Mott College
1401 E. Court St.
Flint, MI 48503
810-762-0200

One plastics course in the Mechanical Engineering Technology program, about 50 students per year. Information attached.

Eastern Michigan University

Erik Lokensgard
Plastics Technology
Eastern Michigan University
118 Sill Hall
Ypsilanti, MI 48197
313-487-1849

Bachelor degree in Industrial Technology with concentration in plastics, includes six courses. About 5-10 students per year. Information attached.

Plastics

The plastics program is designed to prepare men and women for a wide range of technical positions in the plastics processing industry. Graduates have a broad understanding of the plastics industry, polymer materials, common plastics processes, and finishing and decorating techniques. Graduates are employed as cost estimators, sales and marketing representatives, production schedulers, mold designers, part designers, production supervisors, and quality control supervisors.

The Eastern Michigan University student chapter of the Society of Plastics Engineers provides to students a vital link between academic studies and the plastics industry. The Society of Plastics Engineers is an international engineering society, dedicated to education and research about plastics. Members of the EMU student chapter attend meetings of the Detroit SPE and various activities sponsored by the SPE. The student chapter holds meetings, raises funds, organizes field trips, and sponsors seminars.

Employment Opportunities

Approximately 8,000 American companies make plastics their main business. These companies have a great need for technologically educated college graduates. The number of college graduates with formal training in plastics or polymer sciences who currently are working in the plastics or polymer industries has been estimated as only a small fraction of the total number of employees, perhaps no more than 10 percent. This situation has meant that many recent graduates have had the opportunity to choose from several good job offers. The need for trained candidates also is becoming more acute. According to the Society of the Plastics Industry, the use of plastics materials will grow tremendously by the year 2000. This will create an even greater demand for technically trained men and women

Program Requirements

The plastics curriculum includes course work in basic studies, mathematics, science, and contemporary series of technical courses.

Area	Semester hrs.
Symbolics and Communication	20
CTAS 121 Fundamentals of Speech	3
ENGL 121 English Composition	3
ENGL 324 Principles of Technical Communication	3
INTE 105 Computer Applications for Industry	3
MATH 107 Plane Trigonometry	2
MATH 118-119 Mathematical Analysis for Social Sciences I-II	6
Science and Technology	15
CHEM 121 and 122 General Chemistry I	4
PHY 221 Mechanics, Sound and Heat	4
CHEM 123 and 124 General Chemistry II	4
PSY 101 General Psychology	3
Social Science	12
PLSC 112 American Government	3
A course in history	3
ECON 201-202 Principles of Economics I-II	6
Arts and Humanities	11-12
A course in philosophy or religion	3
A course in art, dance, music, or theatre arts	2-3
A course in literature	3
A course in cross-cultural or international studies	3
Physical Education and Health	2
Physical education activities course	2
(Military science courses may be substituted for physical education)	
Total	60-61
Major in Plastics	60
INTE 103 Introduction to Automation	3
INTE 106 Industrial Computer Applications for Manufacturing	3
INTE 122 Engineering Graphics I	3
INTE 123-124 Manufacturing Processes and Methods I-II	6
INTE 200 Industrial Electricity and Controls I	3
INTE 202 Plastics	3
INTE 203 Industrial Operation	3
INTE 218 Industrial Electricity and Controls II	3
INTE 223 Engineering Graphics II	3
INTE 306 Plastic Processing	3
INTE 318 Fluid Power	3
INTE 387 Cooperative Education	3
INTE 409 Plastics Mold Design and Construction	3
INTE 410 Plastics Product Design	3
INTE 411 Plastics Fabricating and Decorating	3
INTE 420 Industrial Quality Control	3
CHEM 270-271 Organic Chemistry with lab	5
INDT 310 Polymers for Engineers and Technologists	3
Restricted elective	1
Free electives	3-4
Total	124

Evening Courses

In an effort to serve students employed full-time, the Department of Industrial Technology offers most plastics courses during the evening.

Scholarships

Society of Plastics Engineers Scholarships

The Eastern Michigan University Society of Plastics Engineers awards scholarships to undergraduate students seeking careers in the plastics industry.

You may be eligible! Scholarships are available for undergraduate students seeking a career in the plastics industry.

Graduates who studied plastics have gained employment at:

RheTech Inc.
Automotive Industries
Gelman Sciences
Pilot Plastics
Johnson Controls
Thetford Corporation
Ford Motor Company
Thermofil Inc.
Himont Inc.
BASF
Exxon
General Motors Corporation

Students working in these companies generally earned a starting salary of more than $25,000.

Other scholarships

- Industrial Technology
- Plastics Pioneers Association
- Society of Plastics Engineers (Detroit section and international)
- Association for Plastics Distribution

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Ferris State University

Gene Whitmore
Ferris State University
Plastics Division
919 Campus Dr., PLS 104
Big Rapids, MI 49307
616-592-2650

Associates Degree in Plastics Technology includes seven plastics courses. About 70 students per year. Bachelor Degree in Plastics Engineering Technology includes nine plastics courses. About 50 students per year. Information attached.

HE APPLIED TEC[illegible]GY CENTER
SU-GRCC WORKING TOGETHER

irand Rapids Community College, founded in 1914, nd Ferris State University, founded in 1884, both have ng-standing commitments to providing high quality ducation to the people of West Michigan.

hese two institutions have come together to create a 30,000-square-foot Applied Technology Center in rand Rapids to serve the workforce development equirements of business and industry.

DMISSIONS INFORMATION

o obtain further information about Plastics Engineering echnology at Ferris State University in Grand Rapids, all or write:

erris State University
pplied Technology Center
51 Fountain Street, NE
rand Rapids, MI 49503-3263

i16) 771-3770
800-998-3425

ax (616) 771-3775

OURSE AND PROGRAM INFORMATION

formation on advising, program enrollment, d course requirements is available by calling i16) 771-3770 or 1-800-998-3425.

i affirmative action, equal opportunity institution, accredited by rth Central Association of Colleges and Universities.

Ferris State University
Applied Technology Center
151 Fountain Street, NE
Grand Rapids, MI 49503-3263

Plastics Engineering Technology

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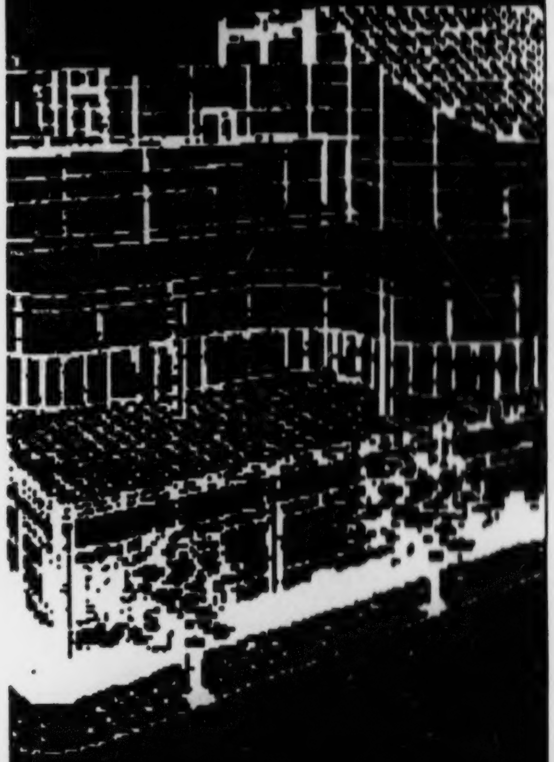
FERRIS STATE UNI[illegible]SITY

Bachelor of Science

Plastics Engineering Technology



APPLIED TECHNOLOGY CENTER

Ferris State University offers a third and fourth year Bachelor of Science degree program in Plastics Engineering Technology at the Applied Technology Center in Grand Rapids. The program is aimed specifically for individuals employed in a plastics processing or manufacturing setting who already have an associate degree in Plastics Technology.

Those not possessing an associate degree should anticipate taking a longer time to acquire the bachelor degree.

The program is designed for those who wish to expand and build upon the base of technical knowledge they have acquired through academic training and work experience. Graduates of the program are prepared to assume technical and leadership positions in many areas of plastics processing, fabrication and manufacturing.

Ferris State University has tailored the program for the part-time student by offering technical coursework in the evenings. In addition, credit earned in equivalent courses taken at other accredited colleges and universities may be applied toward total degree requirements.

CURRICULUM REQUIREMENTS

Technical Core		Credit Hours
PLTS 300	Project Management	2
PLTS 312	Plastics Product Design	4
PLTS 321	Plastics Processing 3	4
PLTS 393	Industrial Internship 2	4
PLTS 400	Plastics Projects	3
PLTS 411	Plastics Finish/Assembly	3
PLTS 499	Plastics Seminar	1
MFGE 351	Introduction to Industrial Engineering	3
MFGE 353	Statistical Quality Control	3
MFGE 423	Engineering Economics	2
MFGE 451	Introduction to Plant Engineering	3
CADD 322	CAD/CAE for Plastics	4
CHEM 311	Polymer Analysis	3
EEET 318	Electrical Tech. for PDT & PLT	4
MECH 240	Statics & Strength of Materials	4

ADDITIONAL REQUIRED COURSES

Business Elective	3

GENERAL EDUCATION REQUIREMENTS*

Cultural Enrichment	9
Social Awareness	9
•including 300-level elective	
Communications	12
•including 300-level technical writing course	
•including public speaking course	
Scientific Understanding	8
•including chemistry and college algebra	

---

* Including Associate Degree Transfer Credits and required courses.

** Must see advisor for specific details and requirements.

CULTURAL ENRICHMENT (Humanities)

Courses may be taken from the following areas of study:

Art
Drama
Foreign Languages
History
Humanities
Literature
Music

SOCIAL AWARENESS (Behavioral Science)

Courses may be taken from the following areas of study:

Anthropology
Economics
Political Science
Psychology
Social Science
Sociology

GMI Engineering & Management Institute

Charles Davis
GMI Engineering & Management Institute
1700 W. Third Ave.
Flint, MI 48504
810-762-7916

Bachelor Degree in Mechanical Engineering, specialty in Plastics includes five courses . About 35 students per year. Information attached.

Machine Design

Required Courses:

ME-342	Advanced Mechanics of Solids
ME-425	Design of Mechanical Assemblies
ME-443	Machine Design Project
ME-447	Machine Design II

Electives (One course from this list, or other with department approval):

IMSE-459	Design for Manufacturing
IMSE-573	Failure Analysis
ME-366	Pneumatic and Hydraulic Systems
ME-429	Introduction to Finite Elements in Engineering
ME-431	Experimental Stress Analysis
ME-444	Computer Graphics Systems
ME-445	Fatigue Considerations in Design
ME-474	Kinematics, Design and Selection of Machine Tools
ME-487	Design of Energy Systems
ME-488	Applied Optics
ME-530	Acoustics, Noise and Vibration
PHYS-580	Acoustics, Noise and Vibration

Manufacturing Process Design

Required Courses:

IMSE-384	Numerically Controlled Systems
ME-448	CAD/CAM Project

Electives (Select at least one course from each list and a total of no less than 11 credits):

Manufacturing Processes:

IMSE-402	Welding Processes
IMSE-403	Material Removal Processes
IMSE-404	Sheet Metal Forming
IMSE-405	Metal Casting Processes
IMSE-407	Polymer Processing

Materials Engineering:

IMSE-472	Heat Treatment of Steels
IMSE-474	Materials Measurement & Assessment
IMSE-573	Failure Analysis
ME-471	Properties of Polymers
CHEM-221	Materials Characterization
CHEM-223	Introduction to Polymer Science
CHEM-227	Industrial Painting Technology

Plastics Product Design

Required Courses:

IMSE-407	Polymer Processing
ME-429	Introduction to Finite Elements in Engineering
ME-471	[illegible]erties of Polymers
ME-472	[illegible]ics Product Design
SM-339	Introduction to Polymer Science

Medical Equipment Design

Required Courses:

IMSE-459	Design for Manufacturing
ME-342	Advanced Mechanics of Solids
ME-360	Introductory Medical Engineering
ME-429	Introduction to Finite Elements in Engineering
ME-471	Properties of Polymers
	Medical Equipment Design

Electives: (Select 4 Credit Hours)

ME-366	Pneumatic and Hydraulic Systems
ME-425	Design of Mechanical Assemblies
ME-431	Experimental Stress Analysis
ME-425	Design of Mechanical Assemblies
ME-444	Computer Graphic System
ME-445	Fatigue Considerations in Design
ME-447	Machine Design II
ME-474	Kinematics, Design and Selection of Machine Tools
ME-530	Acoustics, Noise and Vibration
IMSE-352	Engineering Creativity
IMSE-384	Numerically Controlled Systems
IMSE-407	Polymer Processing
IMSE-460	Ergonomics
IMSE-480	Computer Integrated Manufacturing
IMSE-573	Failure Analysis

Cognates

Cognates consist of elective course groupings which focus on areas other than the Specialties. Guidelines for selecting cognate courses are:

1. The program must contain a capstone design course.
2. One of the courses in the 19 credit hour elective sequence must be taken from the Mechanical Engineering Department listing of core cognate electives. Management courses cannot be used as electives.
3. Courses must be selected in such a manner as to produce coherence and continuity.
4. Courses must be selected so that the total curriculum contains a minimum of 22.5 credit hours of engineering design.
5. Each program will require the approval of a department cognate curriculum advisor.

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Grand Rapids Community College

Rick Cederholm
Plastics Manufacturing Technology
Grand Rapids Community College
151 Fountain St. NE
Grand Rapids, MI 49503
616-771-3650

Associate Degree in Plastics Manufacturing Technology includes eight courses. About 10 graduates per year. Information attached.

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DIRECTOR OF ADMISSIONS
GRAND RAPIDS COMMUNITY COLLEGE
143 BOSTWICK NE
GRAND RAPIDS MI 49502-3027

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 3499 GRAND RAPIDS MI
POSTAGE WILL BE PAID BY ADDRESSEE

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

Plastics Manufacturing Technology

For more information please contact:
Technology Division – 616-771-3660
OR
GRCC Admissions Office – 616-771-4100

Fees

Grand Rapids Community College operates on a semester basis – tuition is paid each semester. Cost of books, instruments, uniforms, transportation, parking and fees is the responsibility of the student.

Financial Aid

Students are eligible for grants, loans, and scholarships. Employment programs are also available. Applications and detailed information may be obtained at the Financial Aid Office or by checking the appropriate box on the inquiry form.

Grand Rapids
Community
College

Grand Rapids Community College
143 Bostwick Ave., N.E.
Grand Rapids, Michigan 49503-3295

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Grand Rapids Community College is an equal opportunity institution and does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, political persuasion, age, weight, height, handicap or marital status in any of its education programs and activities, including admissions and employment. For more information contact Mr. Richard Reid, 535 North Building, Grand Rapids Community College, 143 Bostwick NE, Grand Rapids, MI 49503-3295, 616-771

Plastics Manufacturing Technology

A 2-year program leading to an Associate Degree

Technology Division

Grand Rapids
Community
College

Plastics Manufacturing Technology (935)

Associate in Applied Arts & Sciences

The plastics forming industry continues to grow nationally and locally. An increasing variety of automobile parts, household goods, sports equipment, furniture, toys and machinery parts are formed from plastic.

The Plastics Manufacturing Technology program trains people for jobs as laboratory technicians, mold designers, production supervisors, mold technicians and plastics machinery maintenance technicians for the rapidly growing local plastics forming industry. There are over 150 plastics processing plants in Western Michigan needing trained people. These manufacturers and the Western Michigan Section of the Society of Plastics Engineers have indicated that excellent employment opportunities exist in plastics manufacturing, and that trained workers are in short supply.

Injection molding, blow molding, extrusion, thermoforming, and many secondary processes are studied in the program. Since injection molding is the most prevalent of these processes, it is emphasized. Some advanced standing credit may be granted to entering graduates of high school machine tool and drafting programs that are members of the Kent Metropolitan Articulation Project. The following sequence of classes is presented as a guide only. Courses may be taken in any order, as long as all requirements (including prerequisites) are met.

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First Year

First Semester		Credits
DR 105	Technical Drawing *OR* EG 101	3
MN 219	Survey of Polymer Technology	3
MN 220	Basic Plastics Processing	3
TE 103	Mathematics (9.2 weeks)	4
TE 104	Advanced Technical Math. (6.8 wks)	3
		16

Second Semester		
EL 144	Basic Electricity and Electronics	3
MN 165	Plastics Testing	4
MN 217	Hydraulics	3
MN 223	Injection Molding Theory	3
MN 242	Applied Injection Molding	4
		17

Second Year

Third Semester		Credits
BA 101	Business and Technical English 1 *OR*	
EN 100	College Writing *OR*	
EN 101	English Composition 1	3
CO 101	Introduction to Small Computers	2
DR 241	Mold Design and Theory	3
MN 244	Advanced Plastics Processing	4
MN 249	Statistical Process Control	3
PE ---	Physical Education Elective	1
		16

Fourth Semester		
BA 102	Business and Technical English 2 *OR*	
EN 102	English Composition 2	3
BA 183	Supervision	3
MN 246	Injection Molding Machine Maintenance	3
PE ---	Physical Education Elective	1
PS 110	Survey of American Government	3
SC 135	Interpersonal Communications	3
		16
	Total Credits	65

4/91

Please send me more information

I would like more information about Grand Rapids Community College's *Plastics Manufacturing Technology* program.
Please send it to:

Name ____________________ Soc. Sec. # ____________________

Address ____________________ Telephone ( ) ____________________

City ____________________ State ____________________ Zip ____________________

I would also like;

☐ An Admissions application ☐ Financial Aid/Scholarship information ☐ College Catalog

APPLIED TECHNOLOGY CENTER
Business & Technical Training
Grand Rapids Community College

INJECTION MOLDING MACHINE OPERATOR TRAINING; BEGINNING

Course Description:

This is an eight (8) hour course designed to introduce the learner to Basic Injection Molding Techniques.

Course Prerequisites:

Learners should be currently working at an injection molding company.

Grand Rapids Community College

Course Objectives:

Upon completion of this course the learner will be able to identify machine components, mold components, machine safety and different types of plastics.

Who Should Attend?

- Machine Operators
- Material Handlers

Course Content:

- Machine and Mold Components
- Machine Sequence of Operations
- Safety
- Identification of Materials
- Drying of Materials
- Handling of Materials

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The Beginning Injection Molding Machine Operator training is held in the Applied Technology Center (ATC) at 151 Fountain N.E., or on-site at your company. For more information about training, please call 771-3600.

APPLIED TECHNOLOGY CENTER Business & Technical Training
Grand Rapids Community College

INJECTION MOLDING MACHINE OPERATOR TRAINING; INTERMEDIATE

Course Description:

This is a sixteen (16) hour course designed to build on the concepts of Basic Injection Molding Machine Operator Training.

Course Prerequisites:

Beginning Injection Molding Machine Operator Training.

Course Objectives:

Upon completion of this course the learner will be able to identify Injection Molding defects. Learners will also be able to demonstrate proper molding techniques (fill, pack, hold).

Community College

Who Should Attend?

- Machine Operators
- Material Handlers
- Quality Auditors
- Die Setters
- Supervisors
- Molding Technicians

Course Content:

- Part Defects
- Trimming of Parts
- Clamp, Ejector, and Injection Sequence
- Machine Controls
- Nomenclature and Components
- Types of Molds
- Safety in Handling Molds
- Machine Cycle Sequence
- Start-Up
- Shut-Down

The Intermediate Injection Molding Machine Operator training is held in the Applied Technology Center (ATC) at 151 Fountain N.E., or on-site at your company. For more information about training, please call 771-3600.

APPLIED
TECHNOLOGY
CENTER
Business & Technical Training
Grand Rapids Community College

INJECTION MOLDING MACHINE OPERATOR TRAINING; ADVANCED

Course Description:

This is an eight (8) hour training course designed to provide the learners with a level of comfort, understanding of advanced molding concepts and skills required to be a machine operator.

Course Prerequisites:

Basic and Intermediate Injection Molding Machine Operator Training.

Course Objectives:

Upon completion of this course, learners will be able to demonstrate:

- Proper Machine Set-Up
- Beginning Systematic Injection Molding

Grand Rapids Community College

Who Should Attend?

- Advanced Machine Operators
- Material Handlers
- Mold Changers

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Course Content:

- Proper Machine Set-Up
- Basic Systematic Injection Molding

The Advanced Injection Molding Machine Operator training is held in the Applied Technology Center (ATC) at 151 Fountain N.E., or on-site at your company. For more information about training, please call 771-3600.

January, 1996

APPLIED TECHNOLOGY CENTER
Business & Technical Training
Grand Rapids Community College

INJECTION MOLDING MOLD CHANGE AND SET-UP TRAINING

Course Description:

This is a sixteen (16) hour training course designed to provide learners with a level of comfort, understanding of basic concepts and skills required to change a mold and do a start-up.

Course Prerequisites:

Advanced Injection Molding Machine Operator Training.

Grand Rapids Community College

Course Objectives:

Upon completion of this course learners will have:

- Time Management Skills Needed for Changing a Mold.
- Beginning Working Knowledge of Plastics Material.
- Proper Safety Around Mold and During a Mold Change.
- Beginning Working Knowledge of Systematic Processing Methods.

Who Should Attend?

- Current Mold Change People
- Material Handlers
- Molding Technicians

Course Content:

- Time Management
- Plastic Materials
- Safety
- Mold Prep for Pull
- Mold Set
- Processing Methods

The Injection Molding Change and Set-Up training is held in the Applied Technology Center (ATC) at 151 Fountain N.E., or on-site at your company. For more information about training, please call 771-3600.

APPLIED TECHNOLOGY CENTER
Business & Technical Training
Grand Rapids Community College

INJECTION MOLDING PROCESS TECHNICIAN TRAINING

Course Description:

This is a thirty-two (32) hour training course designed to provide learners with a level of comfort, understanding of basic concepts, and trouble shooting skills necessary for the technician.

Course Prerequisites:

Mold Change and Set-Up.

Grand Rapids
College

Course Objectives:

Upon completion of this course the learners will be able to:

- Demonstrate Safe Practices in the Work Environment
- Identify the Location of all the Safeties on the Injection Molding Machine
- Identify Different Injection Molding Materials
- Demonstrate Basic Systematic Injection Molding Practices

Who Should Attend?

- Process Technicians
- Process Engineers

Course Content:

- Safety in the Work Environment
- Safeties on the Molding Machine
- Injection Molding Materials
- Systematic Injection Molding Process

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The Injection Molding Process Technician training is held in the Applied Technology Center (ATC) at 151 Fountain N.E., or on-site at your company. For more information about training, please call 771-3600.

Kalamazoo Valley Community College

Frank Gregory
Plastics Technology Program
Kalamazoo Valley Community College
6767 West O ave.
Kalamazoo, MI 49003
616-372-5219

Associate Degree in Plastics Technology includes eight courses, 2 grads per year. Certificate Program includes six courses, 2 grads per year. Information attached.

Plastics Technology
AAS degree

PLA 100 Introduction to Plastics 3-3-0
This is a basic course designed to introduce the world of plastics. Lecture topics include: history of plastics, health and safety considerations, environmental impact, thermoset and thermoplastic materials, as well as processing methods used in manufacturing of plastics. Decorating, fabrication, and design considerations will be discussed.

PLA 115 Injection Molding 4-3-3
A course designed to combine lectures with hands-on approach to learning the principles of injection molding. Areas covered will include: safety, machine identification, set-up procedures, machine operations, trouble-shooting, and machine adjustments. Other topics will include: machine monitoring controls, quality control techniques, and part problem solving methods. *(Prerequisite: PLA 100 or instructor's permission)*

PLA 135 Introduction to Polymer Materials 2-2-0
This course is designed to introduce the students to the basic structure, identification and use of the various materials found in the plastics industry. Topic areas included are: basic atomic structure, polymer bonding, identification of thermosets and thermoplastics, and chemical make-up of polymers. This material will be presented by means of lectures, demonstrations, guest speakers, and visual presentations. *(Prerequisite: PLA 100 or instructor's permission)*

PLA 215 Extrusion Processes 4-3-3
This course is designed to introduce the extrusion processes by means of lectures and hands-on training. Areas covered are: identification of the extruder, machine operation, extrusion tooling, take off equipment, and trouble-shooting principles. Extrusion processes covered are: profile extrusion, tubing, sheet extrusion, and blown film extrusion. An emphasis will be placed on safety and quality control methods during the extrusion process. *(Prerequisites: PLA 100 and PLA 115 or instructor's permission)*

PLA 221 Principles Blow Molding 2-1-3
A basic course in the identification, set-up, and operation of blow molding equipment. Information will be presented through lectures, demonstrations, and hands-on training. Topics included in the lectures will be: machine identification, safety, set-up, machine adjustments, blow mold tooling and trouble-shooting. *(Prerequisite: PLA 100 or instructor's permission)*

PLA 222 Thermoforming Principles 2-1-3
A course dealing with the use of thermoforming principles used in the plastics industries. Presentations will be made using lectures and hands-on demonstrations. Topics covered will be: machine adjustments, thermoform tooling, and trouble-shooting methods. *(Prerequisites: PLA 100 or instructor's permission)*

PLA 250 Introduction to Quality Control for Plastics 4-3-3
This course is designed to introduce Quality Control as related to the various plastics industries. Included in this course are topics such as: History of Quality Control, Total Quality Control, inspections and reports, geometric tolerancing, and quality testing. The lab portion makes use of various types of testing equipment found in the plastics industries, such as: melt index testing, moisture testing, impact testing, tensile testing, inspection, and SPC plotting/graphing of dimensions and data. *(Prerequisite: PLA 100 or instructor's permission)*

DRT 100 Fundamentals of Drafting 3-1-6
This course provides an entry point for students with no previous experience in drafting. Emphasis is placed on use of equipment, drafting procedures and techniques, special view utilization, dimensioning, notes and visualization through multiview and pictorial drawings, and sketching.

ELT 100 Basic Electricity 2-2-0
An entry-level course for students with little or no previous electrical training, this course covers what electricity is, AC and DC current, how electricity is generated, magnetism and electromagnetism, Ohm's law, how motors and relays work and how basic electronic devices operate. ELT 100 is for students requiring only ELT 100 in their program of study or students desiring an Electrical Technology elective.

MEC 101 Trends in Manufacturing 3-3-0
This course is designed to expose modern manufacturing concepts to students interested in new technologies. Topics to be covered will include industrial structure, machining, plastics, welding, stamping, and casting. Special emphasis will be given to recent developments such as robots, numerical control, industrial computer applications and CAD/CAM.

MEC 103 Fundamentals of Machine Tool Operation 4-2-6
This course provides an introduction to the concepts and techniques of machine tool operations. Upon completion of this course, the student will have obtained skills and technical knowledge in math calculations, basic inspection techniques, and set up and operation of the lathe, milling machine, shaper, surface grinder, and drill press. The student will also have gained basic knowledge in industrial safety, cutting tools and fluids, and other related topics.

MEC 205 Plastics Tooling Construction 3-1-6
This course is designed to introduce the student to the construction methods necessary to build plastic tooling. Students use skills and knowledge from prior courses to build cooling for injection molding, and blow molding and are introduced to extrusion dies and thermoforming tools. *(Prerequisite: MEC 103 or permission)*

MSM 102 Basics of Mechanical Technology 2-2-0
This course will explore the principles of mechanics and emphasize the practical applications of mechanics in job-related situations. Topics such as science and matter, systems of measurement, mechanics, machines and motion will be discussed.

MSM 120 Basic Fluid Power 2-2-0
The basic theories underlying utilization of fluids as conveyors of power are examined in this course so that technicians will understand why systems work. The fundamentals of component selection are combined with theory to develop working fluid power systems.

WLD 120 Introduction to Welding 3-1-6
This course will give students the information and skills they need to arc gas weld in repair and maintenance work. This course also has a unit on gas cutting and brazing.

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PLASTICS QUICK TRAINING

TECHNOLOGY
APPLICATIONS
CENTER

In order to meet the training needs of the Plastics Injection molding industries, Kalamazoo Valley Community College is offering a short course in Injection Molding. This short course, Plastics "Quick" Training, will be offered on a monthly basis in the KVCC Plastics Lab. The course content will be directed toward "new" and unskilled employees or prospective employees.

COURSE CONTENT

Injection Molding Machine Identification
The Molding Process
The Molding Cycle
Mold Set-up Procedures
Machine start-up/shut-down
The Plastic Part
Molding Defect Identification
Hands-on Injection Molding

NOTE: Course content can be customized to meet individual company needs.

WHO SHOULD ATTEND

This course is directed to new molding employees, temporary employees, sales persons, office staff, anyone interested in learning basic injection molding.

WHERE TRAINING IS HELD

This training will be taught in the Plastics Lab **(Room 5620)** of the KVCC Technology Applications Center, 6767 West O Avenue, Kalamazoo, MI 49003-4070.

SCHEDULED TRAINING DATES

December 5, 6	**8:00 a.m. - 3:30 p.m.**	**Section # 73423**
January 23,24	**8:00 a.m. - 3:30 p.m.**	**Section # 73507**
February 20,21	**8:00 a.m. - 3:30 p.m.**	**Section # 73508**
March 20,21	**8:00 a.m. - 3:30 p.m.**	**Section # 73509**
April 17, 18	**8:00 a.m. - 3:30 p.m.**	**Section # 73510**

NOTE: **Other times can be scheduled to meet your company needs.**

COST: **Cost is $135.00 per person, course minimum is 10, maximum is 20.**

ADVANCED REGISTRATION REQUIRED

To register or for additional information: Call KVCC at (616) 372-5312
Fax: (616) 372-5115

KALAMAZOO
VALLEY
COMMUNITY
COLLEGE

TECHNOLOGY
APPLICATIONS
CENTER

TRAINING FOR THE PLASTICS INDUSTRY

KVCC HAS SEVERAL COURSES THAT SHOULD BE OF INTEREST TO THOSE EMPLOYED IN THE PLASTICS INDUSTRY

- **RAPID PROTOTYPING FUNDAMENTALS**

  PRESENTED BY
  THE SOCIETY OF MANUFACTURING ENGINEERS
  (SME)
  COURSE # MEC 950 **SECTION #** 73553
  FEBRUARY 23, 1996 8:30 AM TO 4:30 PM
  COST: $95 REGISTER EARLY

- **DESIGN FOR INJECTION MOLDING**

  PRESENTED BY: RJG
  COURSE# PLA 906 **SECTION#** 73522
  FEBRUARY 15 & 16 9:00AM TO 4:00 PM
  COST: $400

- **SYSTEMATIC INJECTION MOLDING**

  PRESENTED BY: RJG
  COURSE# PLA 903 **SECTION#** 73521
  MARCH 12, 13, 14 & 15
  COST: $945

- **Pro/Engineer courses to begin in March, 1996**

LAMAZOO
VALLEY
COMMUNITY
COLLEGE

FOR MORE INFORMATION
CALL: 372-5312 or FAX: 372-5115

Macomb Community College

Jim Jacobs
Plastics Technology
Macomb Community College
14500 E. Twelve Mile
Warren, MI 48093
810-286-2119

Associate Degree in Plastics Technology, one grad per year. Certificate program, one grad per year. Information attached.

Plastics Technology

South Campus

The Plastics Technology Curriculum provides students with the training necessary to find employment in either the manufacturing of plastic products or in the areas of machinery and equipmeknt maintenance. Employment opportunities are available in plant and floor operation or in sales activities.

Students completing the Plastics Technology Associate Degree Program will develop knowledge and skills with different plastic materials, processing techniques, tooling and applications, design criteria, various manufacturing processes.

This curriculum is intended to provide a qualified work force to the plastics industry by providing the knowledge technicians need to work with engineers and machine operators to develop and produce a quality product. The program advisor is Professor Al Manore (810-445-7544).

ASSOCIATE OF APPLIED SCIENCE DEGREE REQUIREMENTS
(Minimum of 62 Sem Hrs)

A. Occupational and Related Courses

			Suggested Sequence	Sem Hrs
COR	101	Industrial Technology Fundamentals	■□□□	2
IND	102	Mechanical Systems	■□□□	2
HYD	105	Basic Hydraulics	■□□□	3
COR	103	Computer Orientation for Technicians	■□□□	2
COR	111	Basic Electricity for Electronics	■□□□	3
IND	230	Control of Automated Equipment	■□□□	3
PLS	102	Thermoplastic Materials and Processes	■□□□	3
				18

Specialty I—Plastic Product Manufacturing

			Suggested Sequence	Sem Hrs
PLS	121	Production Processing 1	□■□□	3
PLS	221	Production Processing 2	□■□□	3
PLS	288	Plastics Laboratory Problems	□■□□	3
MGT	118	Human Relations	□■□□	3
		OR		
MGT	210	Organizational Behavior	□■□□	3
MGT	211	Management Decision Making	□■□□	3
SUM	140	Industrial Safety	□□■□	3
				18

Specialty II—Plastics Plant Maintenance

			Suggested Sequence	Sem Hrs
HYD	110	Hydraulic Pumps and Actuator Control	■□□□	3
HYD	212	Hydraulic Circuits and Troubleshooting	■□□□	3
IND	241	Electropneumatic Circuits	□■□□	2
IND	271	Siemens Programmable Controllers	□■□□	2
COR	105	Introduction to Machining Technology	□□■□	3
MMT	125	Manual Machining Principles	□□■□	3
ATW	111	Fundamentals of Gas and Arc Welding	□■□□	2
ROB	270	Robotics and Flexible Automation	□■□□	3
				21

B. Technical Elective Courses by Consent of Program Advisor 5–8

C. Arts and Sciences Component (see page 1) . . . . minimum of 18

Students should plan Arts and Sciences courses with a counselor or program advisor.

Certificate Option—A Certificate in Plastics Technology will be awarded to students successfully completing those courses listed in "A" above and courses in Specialty I or Specialty II (36–39 cr).

Printing Technology

South Campus

The Printing Technology program provides skill development in the many areas of the printing industry. Courses may be taken for job upgrading, general interest, or as skill refreshers for professionals already engaged in the occupational area.

The program consists of the 26 credit hour core and one of the three specialty options. The options are Printing Technology, Electronic Prepress and Printing Management.

The program advisors are Professors Roger Cherry and Will Romano (telephone 810-445-7447 or 810-445-7435).

ASSOCIATE OF APPLIED SCIENCE DEGREE REQUIREMENTS
(Minimum of 62 Sem Hrs)

A. Occupational and Related Courses

			Suggested Sequence	Sem Hrs
*PRT	103	Computing for the Graphic Arts	■□■□	2
*PRT	116	Offset Presswork I	■■□□	3
*PRT	127	Reproduction Photography and Film Assembly I	■■□□	3
*PRT	155	Macintosh and Typesetting Basics	■■□□	3
*PRT	117	Offset Presswork II	□■□■	3
*PRT	128	Reproduction Photography and Film Assembly II	□■■■	3
*PRT	235	Electronic Color Separation	□■■■	3
		OR		
*PRT	236	Electronic Color: Photoshop	□■■■	3
*PRT	237	Electronic Color Prepress I	□■■■	3
*PRT	256	Desktop Publishing I	■■■■	3
				26

Specialty I—Printing Technology

A student must select 14 credit hours from the following list:

			Suggested Sequence	Sem Hrs
PRT	100	Graphic Arts Survey	■■■■	2-4
PRT	110	Introduction to Screen Printing	□■□■	3
PRT	138	Publications Production and Estimating	□■□■	3
PRT	229	Reproduction Photography and Film Assembly III	□■□■	3
PRT	235	Electronic Color Separation	□■■■	3
		OR		
PRT	236	Electronic Color: Photoshop	□■■■	3
PRT	257	Desktop Publishing II	□■■■	3
				14

Specialty II—Electronic Prepress

			Suggested Sequence	Sem Hrs
PRT	235	Electronic Color Separation	□■■■	3
		OR		
PRT	236	Electronic Color: Photoshop	□■■■	3
PRT	238	Electronic Color Prepress II	□■■■	3
PRT	257	Desktop Publishing II	□■■■	3
PRT	258	DeskTop Publishing III	□■■■	3
				15

Specialty III—Printing Management

			Suggested Sequence	Sem Hrs
ACC	107	Survey of Accounting	■■■■	3
BUS	101	Introduction to Business	■■■■	3
BUS	108	Business Law	■■■■	4
MKT	201	Professional Selling	■■■■	3
MGT	121	Small Business Management	■■■■	3
				16

260

Michigan State University

Larry Drzal
College of Engineering
Michigan State University
East Lansing, MI 48824
517-353-5466

Several Bachelor Degree programs with various polymers courses.

Polymer and Polymer Composite Science and Engineering Courses Offered at Michigan State University

CEM - Department of Chemistry
CHE - Department of Chemical Engineering
MSM - Department of Materials Science and Mechanics
ME - Department of Mechanical Engineering
PKG - Department of Packaging

100-499 Undergraduate Courses
800-999 Graduate Courses

CHE 371 Chemical Engineering Materials (3cr)

Structure, properties, and performance of classes of materials emphasizing polymeric materials.

PKG 320 Plastic and Glass Packaging (3cr)

Physical and chemical properties of plastic and glass and their relationship to selection, design, manufacture, performance and evaluation of packages made from these materials.

MSM 380 Polymeric Materials (3cr)

Polymers and engineering plastics. Chemical, physical and mechanical properties. Environmental effects on polymers. Manufacturing processes. Coatings.

BME 424. Biomaterials and Biocompatability (3cr)

Materials science of human implants. Design requirements imposed by the body's milieu and the need to protect the body.

MSM 444 Introduction to Composite Materials (3cr)

Constituents and interfacial bonding. Manufacturing techniques. Microstructure and micromechanics. Theory of anisotropy. Classical laminate theory. Material characterization. Failure damage. Composite structure design.

CHE 472 Composite Materials Processing (3cr)

Manufacturing processes for thermoset and thermoplastic matrix composites. Mechanical and thermal evaluation of composites. Rheology and molding of fiber-filled materials.

MSM 483 Environmental Effects on Materials (3cr)

Electrochemical processes and kinetics. Metallic corrosion and protection. Degradation of ceramics, polymers and composites.

MSM 814 Mechanics of Composite Materials (3cr)

A student may earn a maximum of 6 credits in all enrollments for this course. Topics vary each semester. Topics such as fiber-reinforced composite materials or laminated composite structures.

MSM 814A Fiber-reinforced Composite Materials (3cr)

Application of anisotropic elasticity theory to fiber-reinforced composite materials. Effects of inhomogeneity. Failure analysis. Effective properties.

MSM 814B Laminated Composite Structures (3cr)

Fundamentals of anisotropic elasticity, applications to laminated composite structures, unique states of deformation, stress, vibration and buckling not encountered in isotropic, homogeneous constructions.

PKG 815 Permeabilily and Shelf Life (3cr)

Relationship between the storage life of packaged food and pharmaceutical products and the gas, moisture, and organic vapor permeability of packages in various environments.

PKG 817 Instrumental for Analysis of Packaging Materials (3cr)

Spectrophotometric, chromatographic, thermal and other methods of analysis applied to packaging. Material identification and characterization. Migration and permeation measurements.

PKG 825 Polymeric Packaging Materials (3cr)

Physical and chemical properties of polymeric materials and structures commonly used in packaging. Relationships of properties to performance.

CHE 871/MSM871 Material Surfaces and Interfaces (3cr)

Physical and chemical nature of solid surfaces and their interaction with gases, liquids, and other solids. Characterization of surfaces and solid-solid interfaces. Relation of surface and interfacial structure to engineering phenomena.

ME 873 Design-for-Manufacture Strategies for Composite Materials (3cr)

Modeling of fiberous composite materials. Processing techniques for thermoplastics and thermoesets. Design-for-Manufacture (DFM) strategies.

PKG 875 Stability and Recyclability of Packaging Materials (3cr)

Interactions between packaging materials and their environments including corrosion degradation, stabilization, and recycling. Impacts of packaging disposal.

MSM 876 Advanced Polymeric Materials (3cr)

Advanced topics in polymers structure and properties. Thermoplastics, thermosets, polyblends and elastomers. Processing techniques. Deformation and mechanical properties. Thermal, optical, and chemical properties. Composites.

MSM 918 Thermoelasticity and Viscoelasticity (3cr)

Thermomechanics of solids. Theory of thermoelasticity. Boundary value problems in thermoelasticity. Linear and nonlinear viscoelasticity. Model representation. Boltzmann superposition. Correspondence principle.

CHE 972 Viscoelasticity and Flow of Polymeric Materials (3cr)

Time dependent and steady flow properties of polymeric materials related to molecular and structural parameters. Examples of polymeric blends and composites with the thermoplastic and thermoset components.

CHE 973 Advanced Polymer Reaction Engineering (3cr)

Principles of chain polymerization and network forming reactions. Emulsions and suspension polymerization versus graft reactions on bulk polymers. Reactor design. Morphology in polymer alloys, effects of mixing on polymer reactions.

CEM 956 Selected Topics in Organic Chemistry (3cr)

Principles and methods of polymer synthesis. Physical and physical property relationships to structure.

Michigan Technological University

John Williams
Department of Chemistry
Michigan Technological University
1400 Townsend Drive
Houghton, MI 49931
906-487-2491

Chemical Engineering degree with some plastics, 50-100 grads per year. Information attached.

POLYMER EDUCATION

at

MICHIGAN TECHNOLOGICAL UNIVERSITY

1994-95

Suggestions For Students Majoring in

Chemistry, Chemical Engineering, Materials Engineering, and Mechanical Engineering

with an interest in plastics and composites

The recommended course of action for students wishing to gain qualification in plastics and composites, is to fulfil the requirements for a degree in the profession of their choice, but to use the elective system to gain specific expertise in plastics. Different course requirements in different disciplines make this a little difficult in some areas and extra credit courses outside degree requirements may sometimes be advised. Students are advised on course selection within their department of specialization. For specific advise on selecting topics in Plastics and Composites, students should first contact the following faculty in their department:

CHEMISTRY AND CHEMICAL ENGINEERING
Dr. J. G. Williams Chem Sci & Engrg Blg, Rm 202D

MECHANICAL ENGINEERING AND ENGINEERING MECHANICS
Dr. M. Gupta ME EM Blg, Rm 912

METALLURGICAL AND MATERIALS ENGINEERING
Dr. J. E. Pilling M&M Blg, Rm 405

It is suggested that the basic courses which would lead to a strong foundation in Polymers and Composites are:

Second Year	MY242 and 243
Third and Fourth Years	General Introduction courses CH/CM461, CH/CM463 Chemistry: CH462 and 465 Bio-chemistry: CH462 and 471 Chemical Engineering: CM480 and 490 Mechanical Engineering: ME444 and Polymer Design Projects in ME 471

Overall, it would be expected that a minimum of three courses would be required to provide a basic foundation in polymer science. Extra courses should be added if free electives are available in particular courses.

In addition to these specific topics, all departments offer special topic courses (CH400, CM404, MY470, ME447-8, and ME490-2). These courses allow undergraduate research experience and are very strongly recommended. Research topics cover aspects of polymer synthesis and characterization, polymer manufacturing problems, and design and testing problems. Students work closely with individual faculty for a term on a specific topic of mutual interest. Credits vary with the topic and department but are usually are in the range 1-9. Departmental permission is required for these programs.

COURSE RECOMMENDATIONS BY DEPARTMENT

BS in Chemistry

In chemistry, the number of possible electives is high and polymer specialization is easy. It is strongly recommended that MY242 and 243 (Introduction to Material Science I and II) be taken in the Sophomore year. This is not absolutely necessary but will serve as an excellent foundation for later years. In the Junior and Senior years it is recommended that CH461, 462 and 463 (Polymer Science and Engineering, Polymer Chemistry and Polymer Science and Engineering Laboratory) be taken. Credits in CM480 (Polymer Rheology) are also useful for those with an interest in polymer processing.

BE in Chemical Engineering

In the Chemical Engineering course, the number of electives is low and extra credits over the course minimum are recommended. In Junior year CH/CM461 and CH/CM463 (Polymer Science and Engineering and Polymer Science and Engineering Laboratory) and CM480 (Polymer Rheology) are recommended. CM490 (Polymer Reactor Engineering is suggested for those interested in manufacture of polymers.

BS in Materials Science

In Materials Science MY242-3 is compulsory in Sophomore year. For a polymer specialization, CH461 in the Junior year and a full year of polymer credits in the Senior year is recommended. Courses from those suggested for Chemical Engineering in Junior and Senior years are also recommended.

BE in Mechanical Engineering

Polymer courses can be included under professional elective streams relating to Design, Manufacturing and Solid Mechanics. Courses of particular relevance to polymers and composites are EM414 (Design of Experiments for Mechanically testing Polymers and Composites), and ME444 (Mechanical Design with Polymers and Composites). CM461 (Polymer Science and Engineering) and CM463 (Polymer Science and Engineering Laboratory) is strongly recommended for those with an interest in polymers. A recommended final year would include CM461, ME444 and CM463.

COMPOSITE STUDIES

For courses directed toward the study of composites, it is useful to select the matrix of interest (ie plastic, metallic, or ceramic) and to direct course work around that material. Composite specific courses can then be added as appropriate. Composite design courses are offered in the Departments of Chemical Engineering (co-listed with ME-EM), Mechanical Engineering and Engineering Mechanics and Metallurgical and Materials Engineering.

CURRENT COURSES

Current polymer courses in the Department of Chemistry are:

CH/CM 461	Polymer Science and Engineering	(3,0,0)f 3
CH 462	Polymer Chemistry	(2,1,0)w 3
CH/CM 463	Polymer Science and Engineering Laboratory	(0,1,6)s 3
CH 465	Polymer Stability	(0,3,0)s 3
CH 471	Macromolecular Biochemistry I	(0,3,0)w 3
CH 564	Special Topics in Polymer Science and Engineering	(0,3,0)f,w,s 3-9
CH/CM 565	Interfacial Polymer Science	(2,1,0)s 3

Current courses in the Department of Chemical Engineering are:

CM 480	Polymer Rheology	(0,3,0)f 3
CM 490	Polymer Reactor Engineering	(0,3,0)f 3
CM 554	Macromechanics of Composite Materials	(0,3,0)s 3
CM 555	Micromechanics of Composite Materials	(0,3,0)f 3
CM 580	Advanced Polymer Rheology	(0,3,0)w 3
CM 585	Polymer Processing	(0,3,0)s 3

Current courses in the Department of Metallurgical and Materials Engineering are:

MY 242	Introduction to Materials Science I	(3,1,0)f 4
MY 243	Introduction to Materials Science II	(3,1,0)w 4
MY 245	Construction Materials Science	(3,1,0)s 4
MY 472	Composite Materials Design	(0,2,3)w 3

Montcalm Community College

Dan Herman
Occupational Programs
Montcalm Community College
2800 College Dr. SW
Sidney, MI 48885
517-328-2111

Four courses in plastics and mold design.

Oakland Community College

Technology Department
Oakland Community College
2900 Featherstone Rd.
Auburn Hills, MI 48326
810-340-6618

Associates Degree in manufacturing technology, includes 3 plastics courses, about 45 students per year.

Schoolcraft College

Chuck Gibbons
Dept. of Materials Science
Schoolcraft College
18600 Haggerty Rd.
Livonia, MI 48152
313-462-4458

One introductory course

St. Clair County Community College

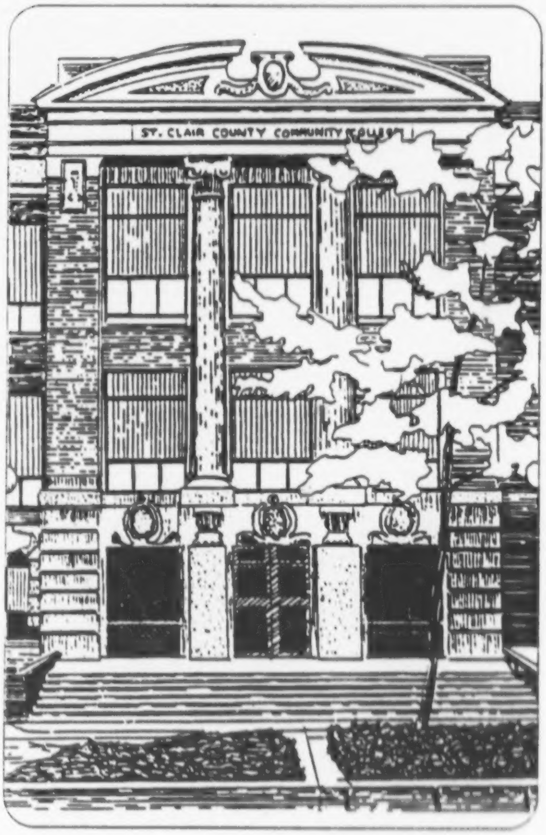
John Borris
Industrial/Applied Technology
St. Clair County Community College
323 Erie St., P.O. Box 5015
Port Huron, MI 48061
810-989-5621

Associate Degree in Plastics Technology includes five courses, Certificate Program includes three courses. Apprenticeship program. About 30 students total per year. Information attached.

Plastics Technology

ASSOCIATE DEGREE PROGRAM

St. Clair County Community College
323 Erie Street, P.O. Box 5015 · Port Huron, MI 48061-5015


ST. CLAIR COUNTY COMMUNITY COLLEGE

NOTICE OF NONDISCRIMINATION POLICY

It is the policy of St. Clair County Community College that no person shall, on the basis of race, color, national origin, sex, handicap, age, religion, creed, or marital status, be excluded from admission or participation in, be denied the benefits of, or be subjected to discrimination under any program or activity, and in employment.

Any questions concerning Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, which prohibits discrimination on the basis of sex, or any inquiries related to Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of handicap, should be directed to: Robert L. Bender, Title VI, Title IX and Section 504 Coordinator, St. Clair County Community College, 323 Erie Street, P.O. Box 5015, Port Huron, MI 48061-5015, (810) 989-5536 or 1-800-553-2427

Plastics manufacturing has increased tremendously in the last few years, especially in the automotive and consumer electronics equipment markets. The "technology of plastics" has increased through the development of new materials and plastic molding methods. The result has been the manufacture of new products with the desired physical properties produced with greater efficiency resulting in lower production costs.

SCCCC has a two-year Associate Degree (A.A.S.) in Plastics Technology to prepare you for a rewarding career. The first year of the program concentrates on the injection molding processes, properties of materials, costs, and quality of the product. The second year of the program specializes in the rheology of plastic molding, physical testing of plastics, and mold design.

Skills and Abilities Required:

- Work within precise limits or standards of accuracy
- Rate information using quality standards
- See details in objects and recognize slight differences in shapes or shadings
- Work easily with test equipment and machines
- Select tools to do job in a cost-efficent manner
- Ability to express yourself well orally and in writing
- Read and interpret diagrams and manuals

Michigan Entry-Level Salary Range: $15,500 - $20,500

Employment Outlook:

Good for Southeast Michigan and Western Michigan. Expected to grow at least as fast as all occupations nationally. It is estimated that the use of plastics will be greater than the use of all other materials by the year 2000.

Job Titles:

Plastics Process Technician, Plastics Maintenance Technician, Process Engineer, Materials/Product Test Technician, Mold Repair Technician, Plastic Tool Technician

A Four-Year Plastics Degree:

The Associate Degree (A.A.S.) in Plastics Technology can be transferred to a bachelor's degree in Manufacturing Engineering Technology at Wayne State University or a bachelor's degree program in Plastics Engineering Technology at Ferris State University. For further information on transfer contact the program advisor for Plastics Technology.

Further Program Information:

Call the Industrial Technology Department at (810) 989-5628 or call the Counseling Department at (810) 989-5520. Tours of our laboratory facilities can be arranged by calling (810) 989-5621.

BLUE WATER REGION EDUCATION PARTNERSHIP
EDUCATION
FOR THE 21st CENTURY

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273

Suggested Program Sequence

FIRST YEAR - 1st Semester			Semester Hours
PLT	120	Introduction to Plastics	4
MTH	102*	Technical Math/Elementary Algebra	5
ENG	101T	Introduction to Writing for Technical Students	3
CIS	200	Electronic Spreadsheets	3
DR	160	Fundamentals of Drafting	3
			18

2nd Semester			Semester Hours
PLT	121	Plastics Manufacturing Processes I	4
PLT	122	Physical Properties of Plastics	4
MTH	153	Technical Math/Applied Algebra & Trigonometry	4
IA	141	Basic Hydraulic Components & Circuits (formerly FLP 141)	3
MFT	111	Machine Tools	3
			18

SECOND YEAR - 1st Semester			Semester Hours
PLT	220	Introduction to Injection Molds	4
TP	258	Mechanics Physics	4
CHM	101	Introduction to Inorganic Chemistry	4
MTH	204	Technical Math/Applied Algebra & Trigonometry II	4
or			
MTH	113	Pre-Calculus Math	4
			16

2nd Semester			Semester Hours
PLT	221	Plastics Manufacturing Processes II	4
PS	101	Political Science	3
QA	117	Statistical Process Control	3
ENG	104	Technical Report Writing	3
IA	100	Industrial Electricity	3
			16

* Students must see advisor for correct mathematics placement.
A transfer agreement exists with Ferris State University. See Plastics Technology program advisor for transfer of credit.

For further information and application, call or write the Admissions Office at:

(810) 989-5500

St. Clair County Community College • 323 Erie Street • P.O. Box 5015 • Port Huron, MI 48061-5015

— FINANCIAL AID —

St. Clair County Community College offers a variety of scholarships and financial aid programs, and we will work with you to secure maximum financial assistance to meet your financial need. Applications for financial aid and scholarships are available in the Financial Aid Office. Call the Financial Aid Office if you have any questions about financial assistance at (810) 989-5530.

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ST. CLAIR COUNTY COMMUNITY COLLEGE

PLASTICS PROGRAM
Certificate Program

Suggested Program Sequence

1st Semester		Semester Hours
PLT 120	Introduction to Plastics	4
ENG 101T	Intro. to Writing for Technical Students	3
MTH 102*	Technical Math/Elementary Algebra	5
	Elective (Core of Concentration)	
	Elective (Core of Concentration)	4-6
		16-18

2nd Semester		
PLT 121	Plastics Manufacturing Processes I	4
PLT 122	Physical Properties of Plastics	4
or		
PLT 220	Introduction to Injection Molds	4
	Elective (Core of Concentration)	
	Elective (Core of Concentration)	
	Elective (Core of Concentration)	8-10
		16-18

*Students should enroll in Technical Math 102 with recommendation of advisor. Please see advisor for recommended course schedule.

Over -- Core of Concentration

AREAS OF CONCENTRATION

I.	Mold Design and Construction	Semester Hours
DR 160	Fundamentals of Drafting	3
DR 161	Descriptive Geometry	3
DR 268	Computer Aided Drafting & Design	3
MFT 111	Machine Tool	3
MFT 115	Geometric Dimensioning & Tolerancing	2
MFT 118	Metrology I	1
MFT 119	Metrology II (CMM)	1
MFT 214	Advanced Machine Tool	4
QA 117	Statistical Process Control	3
II.	Production Processing	
CIS 115	Microcomputer Applications	4
IA 100	Industrial Electricity (formerly ELT 106)	3
IA 143	Hydraulics & Pneumatics	4
MFT 114	Blueprint Reading	2
MFT 115	Geometric Dimensioning & Tolerancing	2
QA 117	Statistical Process Control	3
III.	Marketing & Sales	
BUS 150	Principles of Business	4
BUS 155	Principles of Management	3
BUS 179	Introduction to Marketing	4
BUS 181	Professional Selling	3
CIS 115	Microcomputer Applications	4
IV.	Plant Maintenance	
IA 100	Industrial Electricity (formerly ELT 106)	3
IA 143	Hydraulics & Pneumatics	4
IA 101	Introduction to Industrial Automation	3
MFT 114	Blueprint Reading	2
MFT 111	Machine Tool	3
WELD 110A	Basic Oxyacetylene Welding, Cutting & Brazing	1
WELD 110B	Basic Shielded Metal Arc Welding I	1
WELD 110C	Shielded Metal Arc Welding II	1
V.	Quality Control	
MFT 118	Metrology I	1
MFT 119	Metrology II (CMM)	1
MFT 114	Blueprint Reading	2
MFT 115	Geometric Dimensional & Tolerancing	2
QA 117	Statistical Process Control	3
CIS 115	Microcomputer Applications	4

University of Detroit-Mercy

Dan Klempner
Polymer Institute
University of Detroit-Mercy
4001 W. McNichols
Detroit, MI 48219
313-993-3385

Bachelor Degree in Chemical Engineering with courses in polymers. Information attached.

POLYMER & PLASTICS ENGG ACADEMIC SUMMARY FORM 4/95

Name: ______________________ SSN: ______________

Major: ______________________ Date of Entry: ______________

Core Curriculum Requirements:

Course	Hrs	Grade
Objective I:	Communication skills	
CST101	3	____
ENL131	3	____

Objective II: Math & Computer skills
Satisfied by major program

Objective III: Scientific literacy
Satisfied by major program

Objective IV: Meaning and value

PHL100	3	____
RS________	3	____
RS/PHL____	3	____

Objective V: History and culture
2 courses from same dept. - area A or B or C

__________	3	____
__________	3	____

1 course from area D

__________	3	____

Objective VI: Social responsibility

E100	2	____	CTP 300	1	____
E301	1/2	____	CTA 301	2	____
E302	1/2	____	CTA 302	2	____
E303	2	____	CTA 303	2	____

Other Courses:

__________ __ ____
__________ __ ____
__________ __ ____
__________ __ ____
__________ __ ____

Major Program Cumulative Record

Term	Cr Hr	Ttl Hrs	Ttl Pts	QPA

Common Courses for Engineering Studen

Course		Hrs	Grade
MTH141	Anal Geo & Calc I	4	____
MTH142	Anal Geo & Calc II	4	____
MTH241	Anal Geo & Calc III	4	____
MTH372	Diff Eq w Lin Alg	4	____
MTH427	App Prob & Stat	3	____
PHY160	Gen Physics I	3	____
PHY161	Gen Phys I Lab	1	____
PHY162	Gen Physics II	3	____
PHY163	Gen Phys II Lab	1	____
CHM107	Gen Chem I	3	____
CHM108	Gen Chem II	3	____
CHM110	Chem Lab I	1	____
E101	Engg Des & Graph	3	____
E103	Comp Sci I	3	____
ENL303	Tech Writing	3	____

Polymer & Plastics Engineering Major Courses:

		Hrs	Grade
CHM111	Chem Lab II	2	____
CHM224	Org Chem Lab	1	____
CHM227	Org Chem I	3	____
CHM229	Org Chem II	3	____
CHM341	Chem Thermo	3	____
CHM420	Poly Engr & Sci	3	____
CHE326	Process Anal	3	____
CHE432	Chem Rea Engr	3	____
CHE468	Proc Des I	3	____
E312	Statics	3	____
E314	Fluid Mechanics	3	____
E317	Sci of Matls	3	____
E320	Prin of EE	3	____
E321	Prin of EE Lab	1	____
E326	Def Bodies	3	____
E327	Def Bodies Lab	1	____
PPE422	Poly Proc	3	____
PPE423	Poly Proc Lab	3	____
PPE432	Poly Plant Des	3	____
PPE434	Parts Des/Mold	3	____
PPE438	Polymer Rheo	3	____
PPE440	Polymer Engr	3	____
T.E.		3	____
T.E.		3	____

T.E. = Any CHE or Adv CHM course.

University of Michigan-Ann Arbor

Dave Martin
College of Engineering
University of Michigan-Ann Arbor
2022 Dow Building
Ann Arbor, MI 48109
313-764-4970

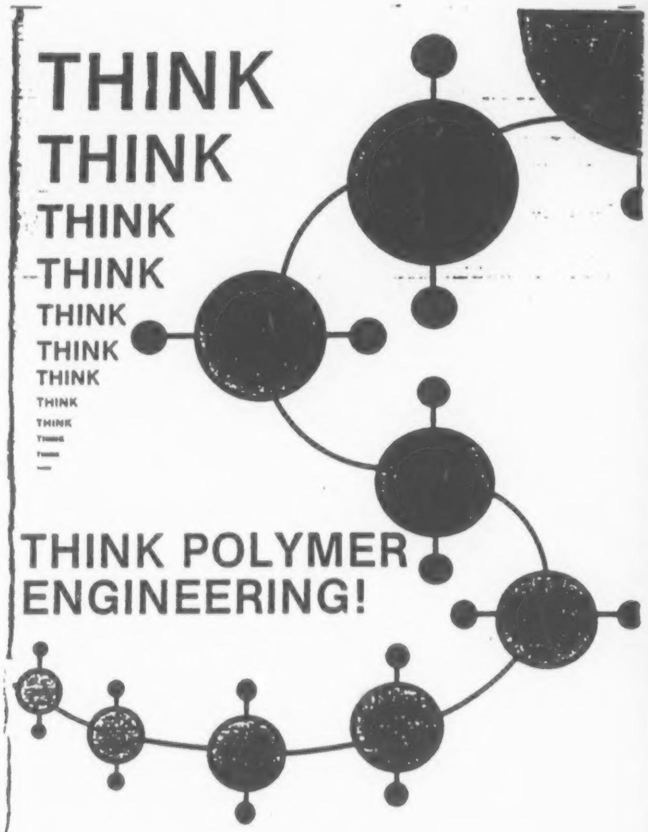
Bachelor Degree in Materials with major in polymers.

Wayne State University

Andrea Eisenberg
Dept. of Engineering
Wayne State University
6050 Cass Ave.
Detroit, MI 48202
313-577-3780

Bachelor Degree in Materials Science with courses in polymers. Graduate certificate in Polymer Engineering. Information attached.

Wayne State University
Dr. Simon Ng
Associate Professor
Chemical Engineering
Detroit, Michigan 48202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THINK POLYMER ENGINEERING!

Graduate Certificate Program in Polymer Engineering

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Department of Materials Science an
Engineering
Department of Chemical Engineerin
College of Engineering
Wayne State University
Detroit, Michigan 48202

FOR MORE INFORMATION

[redacted]

Please contact Professor Simon Ng or Professor Esin Gulari, Polymer Engineering Graduate Certificate Program, telephone: 313/577-3800, or fill out and mail the form below.

Wayne State University

Please send

☐ More information about the Graduate Certificate program in Polymer Engineering.

☐ Graduate Application.

☐ Visitor status information.

☐ Chemical Engineering graduate information.

☐ Materials Science and Engineering graduate information.

Please print or type

Name__________________________________
Position________________________________
Affiliation______________________________
Address________________________________
City, State, Zip___________________________
Business Phone___________________________
Home Phone_____________________________

PROGRAM DESCRIPTION

[redacted]

Our society is becoming increasingly reliant on sophisticated materials; advanced polymers are no used for structural and decorative parts of vehicl packing materials, electronic devices, sporting goo adhesives, paints and coatings, and building mater als. Nearly every major industry has potential appl cations for engineering polymers. To meet the need of modern society and to remain competitive in technology, many industries have initiated major programs to develop polymer materials. This has create abundant opportunities for engineers and chemist with backgrounds in polymers.

Within the College of Engineering at Wayne Stat University, the Departments of Chemical Engineerin (CHE) and Materials Science and Engineering (MSE are active in polymer research, and maintain a rigo ous polymer engineering curriculum. Our graduat certificate program in polymer engineering is designed to meet the needs of working engineers an scientists who are seeking professional advancemen in this growing field.

The program provides comprehensive instruction i the fundamentals of polymer science and engineerin The basic curriculum is supplemented by course offerings in specialized topics such as polymer rheology, polymer kinetics, polymer solutions, and composite materials. Instruction is given by the faculty o the CHE and MSE departments, and by distinguishe industrial polymer scientists and engineers, who often lecture on novel research and polymer applications. Opportunities for direct involvement in research projects are available.

The Graduate certificate consists of twelve cred hours, including six hours of required course work Six hours of electives can be selected to meet individual interests. The program courses are also availabl as electives to both undergraduate and graduate students in our regular degree programs.

measuring static and dynamic properties of polymers in solution.

CHE/MSE 738. Polymer Kinetics (3 Credits). (prerequisite: CHE/MSE 535)

Polymerization kinetics of various types of reactions, including polymerization and copolymerization, polymer reactor design, batch and continuous stirred tank reactors, developing techniques and spectroscopic methods.

The following courses will be counted as certificate credits when the subject is relevant to polymer science. A maximum of three credits combined total of CHE/MSE/ME 790 or 896 can be taken.

CHE/MSE/ME 790. Directed Study (1 to 3 Credits).

Library investigation of an approved project in polymer engineering. Independent study, conferences with faculty advisor, and preparation of a comprehensive written and oral report.

CHE/MSE/ME 795. Special Topics (1 to 3 Credits).

Graduate seminar on advanced subjects in polymer engineering. Topics will vary.

CHE/MSE/ME 896. Research (1 to 3 credits).

Library and laboratory investigation of an approved proposal for an advanced polymer research project. Conferences and periodic oral progress reports. Comprehensive project report upon completion.

INDUSTRIAL ADVISORY COMMITTEE

Members of the Industrial Advisory Committee represent major polymer suppliers and users. The Committee periodically reviews this certificate program to maintain its dynamic nature and relevance to state-of-the-art industrial practice.

HOW TO APPLY

Candidates for the Certificate Program must appl for admission to the WSU Graduate School. Applicants should submit the University's Application fo Graduate Admission (Form 10-491A) to the degre program of their choice. The Graduate Certificate i Polymer Engineering may be elected as an independent program, or concurrently with graduate stud for the MS degree in Materials Science and Engineering or Chemical Engineering. If no MS degree is desired, the applicant should check "Non-Degree" an insert the words "Graduate Certificate Program i Polymer Engineering" on the form. Undergraduate and visitors may enroll in individual courses, but wil be ineligible to earn the Certificate without admissio to the Graduate School.

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 9415 DETROIT, MI

POSTAGE WILL BE PAID BY ADDRESSEE

Dr. Simon Ng
Department of Chemical Engineering
Wayne State University
5980 Cass Ave.
Detroit MI 48202-9861

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IN THE
UNITED STATES

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PROGRAM BENEFITS

The Graduate Certificate Program in Polymer Engineering provides specialized formal education for working engineers and scientists. Those enrolled in the program will

- learn the fundamentals of polymer science and engineering.
- extend their knowledge of current polymer research topics.
- maintain technical competitiveness by broadening their polymer expertise.
- earn a graduate certificate that documents their professional advancement.

CERTIFICATE PROGRAM REQUIREMENTS

Candidates must have a bachelor's degree in engineering, chemistry, or physics. A total of twelve credits, six in required courses and six in electives, with a grade of B or better, must be completed to earn the certificate.

REQUIRED COURSES

Candidates are required to take six credits of required courses: CHE 535 and CHE 536.

CHE/MSE 535. Polymer Science (3 Credits).

Fundamental relationships between chemical structure and physical properties of high polymers. Basic structures, states and transitions of polymers. Polymerization reactions and processes. Molecular weight, viscous flow and mechanical properties of polymers.

CHE/MSE 536. Polymer Processing (3 Credits).

A detailed analysis of polymer processing. Rheology of polymers, flow in tubes, calendering, extrusion, injection molding, fiber spinning, and coating.

ELECTIVE COURSES

Candidates will be required to take six credits from among the following courses. At least one course must be at the 700 level or higher.

CHE/MSE 560. Composite Materials (3 Credits).
(co-requisite: CHE/MSE 535)

Introduction to physical understanding of composites: fiber and polymer matrix properties, interfacial adhesion, manufacturing, elastic and strength properties of unidirectional and random laminae. Other topics: various performance properties and plastic design applications.

ME 572. Mechanics: Composite Materials (4 Credits).

Analytical modeling of micro-mechanical and macro-mechanical behavior of composite materials. Stiffness, strength, hydrothermal effects, laminate analysis, viscoelastic and dynamic behavior. Experimental characterization of mechanical behavior.

CHE/MSE 733. Polymer Rheology (3 Credits).
(prerequisite: CHE/MSE 520 or 720 or equivalent fluid mechanics)

Flow behavior of polymer liquids; methods of measuring fundamental rheological parameters using viscometric devices; prediction of material properties from theoretical principles. Correlation between theoretical and experimental results.

CHE/MSE 735. Polymer Solutions (3 Credits).
(prerequisite: CHE/MSE 535)

Thermodynamics and phase equilibria of polymer solutions. Configurational and frictional properties of polymers in solution. Experimental techniques for

Western Michigan University

Paul Engelmann
Dept of Engineering Technology, Kohrman Hall
Western Michigan University
Kalamazoo, MI 49008
616-387-6527

Bachelor of Manufacturing Engineering with plastics major, 10 grads per year. Information attached.

Name______________________________ Student No.______________

WESTERN MICHIGAN UNIVERSITY
Department of Industrial & Manufacturing Engineering

MANUFACTURING ENGINEERING TECHNOLOGY
(See reverse side for Cast Metals, Wood Products, and Plastics Option requirements)
Bachelor of Science Degree
1996-97 Catalog

SEMESTER I - FALL

Grade	Semester				
____	____	IME	142	Engineering Graphics	3
____	____	IME	150	Intro to Manufacturing (AREA VII)	3
____	____	MATH	118	Precalculus Mathematics (Prof. 3)	4
____	____	*CS*	*105*	*Introduction to Computers*	*3*
____	____	*IME*	*102*	*Technical Communication (Prof. 1)*	*3*
					16

SEMESTER II - WINTER

Grade	Semester				
____	____	IME	154	Machining Fundamentals	3
____	____	*MATH*	*200*	*Calculus with Applications (Prof. 4)*	*4*
____	____	*CHEM*	*103*	*General Chemistry I (AREA VI)*	*4*
____	____	PHYS	113	General Physics I (AREA VI)	4
____	____	PHYS	114	General Physics I Lab (AREA VI)	1
					16

SEMESTER III - FALL

Grade	Semester				
____	____	IME	246	Introduction/Computer-Aided Design	3
____	____	*ECE*	*100*	*Fundamentals of Circuits & Electronics*	*3*
____	____	*PHYS*	*115*	*General Physics II*	*4*
____	____	*PHYS*	*116*	*General Physics II Lab*	*1*
____	____	COM	104	Public Speaking (Prof. 4)	3
____	____	AREA I*		Fine Arts	3
					17

SEMESTER IV - WINTER

Grade	Semester				
____	____	IME	242	Designing for Production	3
____	____	CMD	254	Properties of Materials	3
____	____	CMD	255	Material Science Lab	1
____	____	IME	281	Statics & Strength of Materials	4
____	____	ECE	101	Fundamentals of Electronics/Machines	3
____	____	MATH	260	Elementary Statistics (Prof. 4)	4
					18

SEMESTER V - FALL

Grade	Semester				
____	____	IME	250	Plastics Properties & Processing	3
____	____	IME	352	Metal Casting	3
____	____	IME	383	Thermodynamics	2
____	____	IME	384	Fluid Mechanics & Hydraulics	2
____	____	IME	328	Quality Assurance & Control	3
____	____	ECON	201	Principles of Economics (AREA V)	3
					16

SEMESTER VI - WINTER

Grade	Semester				
____	____	IME	358	Computer-Aided Manufacturing	3
____	____	IME	320	Engineering Cost Analysis	3
____	____	IME	326	Operations Planning & Control	3
____	____	________		Approved Elective	3
____	____	AREA III*		United States: Cultures & Issues	3
____	____	AREA VIII		Health & Well-Being	2
					17

SEMESTER VII - FALL

Grade	Semester				
____	____	IME	357	Fabrication & Pressworking	3
____	____	IME	458	Advanced Manufacturing Systems	3
____	____	IME	483	Project Design & Control (Prof. 2)	1
____	____	ME	375	Experimental Stress Analysis	3
____	____	________		Approved Elective	3
____	____	AREA II*		Humanities	3
					16

SEMESTER VIII - WINTER

Grade	Semester				
____	____	IME	481	Metrology	3
____	____	IME	485	Senior Project (Prof. 2)	3
____	____	IME	422	Conference Leadership (AREA V)	3
____	____	________		Approved Elective	3
____	____	AREA IV*		Other Cultures & Civilizations	3
					15

TOTAL-----131

*** At least one of these courses must be at the 300-400 level**

NOTE: ***A grade of "C" or better in gate courses (indicated in italicized type) is required for enrollment in upper division courses offered by the Department of Industrial & Manufacturing Engineering.***

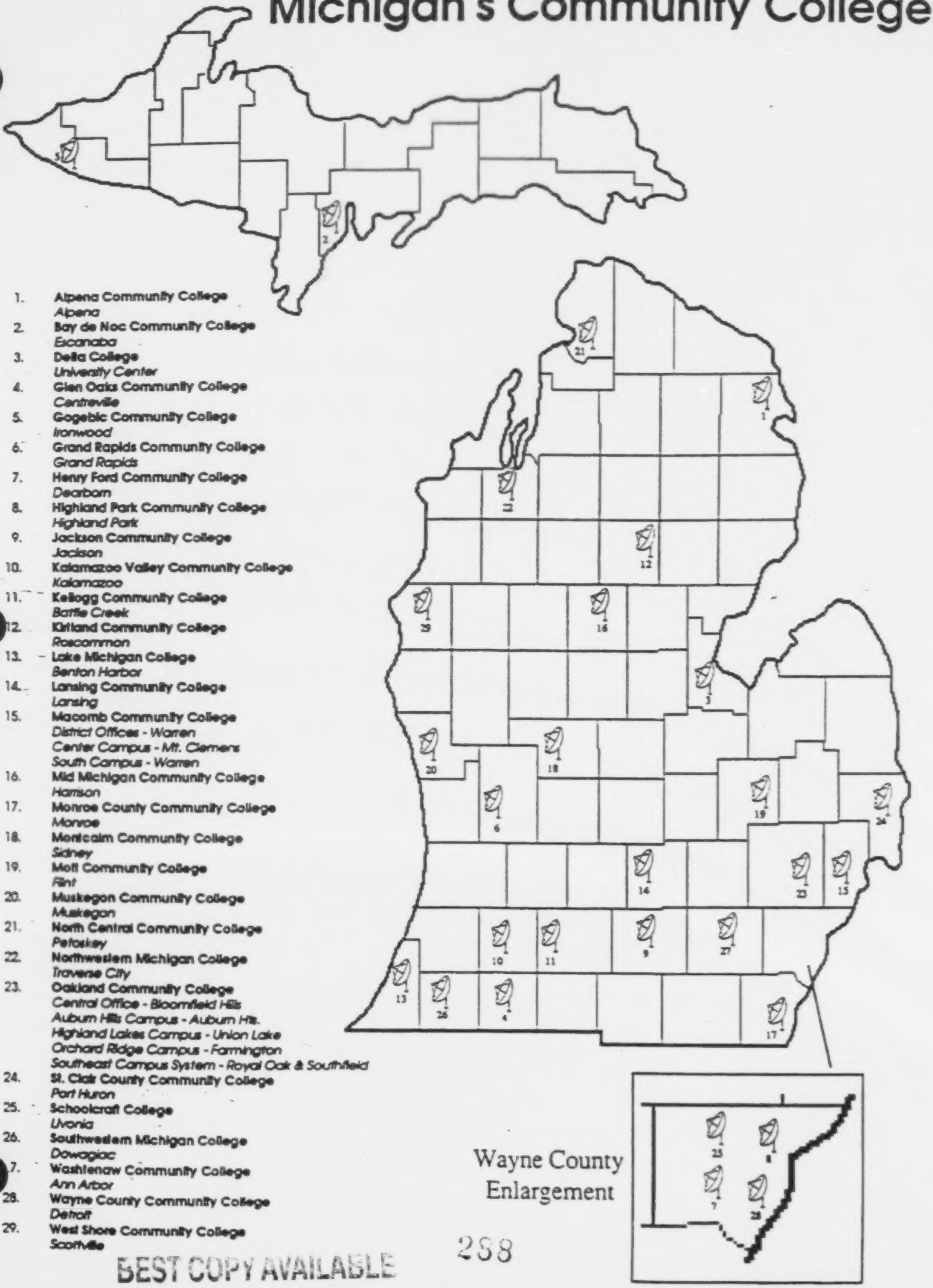
6/12/96

Option:______________________________

Accepted for upper division courses:

______________________________ ______ ______
Advisor's signature **Date**

Michigan's Community Colleges



1. **Alpena Community College**
   Alpena
2. **Bay de Noc Community College**
   Escanaba
3. **Delta College**
   University Center
4. **Glen Oaks Community College**
   Centreville
5. **Gogebic Community College**
   Ironwood
6. **Grand Rapids Community College**
   Grand Rapids
7. **Henry Ford Community College**
   Dearborn
8. **Highland Park Community College**
   Highland Park
9. **Jackson Community College**
   Jackson
10. **Kalamazoo Valley Community College**
    Kalamazoo
11. **Kellogg Community College**
    Battle Creek
12. **Kirtland Community College**
    Roscommon
13. **Lake Michigan College**
    Benton Harbor
14. **Lansing Community College**
    Lansing
15. **Macomb Community College**
    District Offices - Warren
    Center Campus - Mt. Clemens
    South Campus - Warren
16. **Mid Michigan Community College**
    Harrison
17. **Monroe County Community College**
    Monroe
18. **Montcalm Community College**
    Sidney
19. **Mott Community College**
    Flint
20. **Muskegon Community College**
    Muskegon
21. **North Central Community College**
    Petoskey
22. **Northwestern Michigan College**
    Traverse City
23. **Oakland Community College**
    Central Office - Bloomfield Hills
    Auburn Hills Campus - Auburn Hts.
    Highland Lakes Campus - Union Lake
    Orchard Ridge Campus - Farmington
    Southeast Campus System - Royal Oak & Southfield
24. **St. Clair County Community College**
    Port Huron
25. **Schoolcraft College**
    Livonia
26. **Southwestern Michigan College**
    Dowagiac
7. **Washtenaw Community College**
    Ann Arbor
28. **Wayne County Community College**
    Detroit
29. **West Shore Community College**
    Scottville

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The Role of Postsecondary Institutions in School-to-Work

School-to-work systems are designed to provide all youth with access to a broad range of opportunities after their secondary education is completed. Options can include direct entry into the workforce or enrollment in a postsecondary institution. These postsecondary institutions include career, technical, two-year colleges, and four-year colleges or universities, and all can take active roles in supporting school-to-work systems and transitioning students to successful paths after high school. Postsecondary institutions offer a wealth of research and applied knowledge and a variety of other resources to transition students and to assist high schools when designing education and career preparation systems.

Postsecondary institutions take on an even more crucial role given the changing nature of work and the economy. According to the U.S. Bureau of Labor Statistics, about one-half of the industries that will experience an increase in the jobs available by the year 2005 will require some form of education and training beyond the secondary level. In addition, employers have found that one out of every five workers is unable to meet all of his or her job requirements because they either lacked the skills required on their job or their jobs had expanded to demand more skills. In response to this, postsecondary institutions have begun to ensure that all students have the opportunity to experience a combination of academic and career skills training at the postsecondary level. The School-to-Work Opportunities Act supports this by promoting the active involvement of representatives of postsecondary institutions in local partnerships with schools, educators, employers, organized labor, parents, young people, and community-based organizations in the operation of school-to-work systems.

Postsecondary institutions have strong community links and are equipped to provide youth with specific occupational training and career preparation activities. In addition, postsecondary involvement reinforces the value of school-to-work for traditional college-bound students, showing that work-based and contextual learning are valuable methods of preparation for success in college. As a result, the involvement of postsecondary institutions--regardless of the type or level of postsecondary institution--may benefit young people participating in school-to-work.

This bulletin presents strategies to engage postsecondary institutions in school-to-work. It then presents a listing of resources that can provide additional information and assistance to school-to-work practitioners attempting to foster stronger links with postsecondary institutions.

Strategies

Articulation Agreements. Articulation agreements are formal agreements between secondary and postsecondary institutions that detail the roles and responsibilities of each institution in a school-to-work or workforce preparation system. Technical Preparation (Tech Prep) agreements, for example, outline a continuum of services available to youth over a four-year sequence, from eleventh grade through a two-year college experience. Other programs have extended these agreements to a "2 + 2 + 2" sequence, which involves enrollment and continual training in a four-year college after graduating from a two-year postsecondary institution.

Articulation agreements directly impact how easily young people can transition from one level of education to the next. For example, some agreements provide for high school students to take classes at local colleges and receive credit for this coursework. Articulation agreements can also help determine the content of academic and occupational curricula, and describe the allocation of responsibility for specific aspects of training and program services.

Developing Partnerships and Systems. Postsecondary institutions often have strong connections to local employers, labor unions, community-based organizations, high schools, and other postsecondary institutions. Within the framework of school-to-work, these bonds can help bring together representatives from key stakeholder groups to ensure that all are fully involved in the development, design, and implementation of a school-to-work initiative.

Postsecondary institutions can also contribute to overall system design, development, and implementation. For example, postsecondary institutions can help develop curricula that apply to both career development and postsecondary academic demands. In addition, practitioners can build on the research base of postsecondary institutions to develop systems that are relevant to all students and all sectors of the economy. Through their research and links to other institutions, postsecondary institutions can help identify which occupations are most likely to experience growth, the type of education and training that will best help young people succeed in these occupations, and methods of effectively evaluating participant and system success.

Coordinated Learning. Effectively integrating postsecondary institutions into a school-to-work system allows young people to participate in a sequence of occupational learning experiences from elementary through postsecondary education. For example, elementary and secondary schools can focus on broader work-readiness skills, such as teamwork, problem-solving, and critical thinking. Based on these experiences, youth can make more informed decisions regarding specific career paths, and can choose to enter more specific academic and occupational training programs at the postsecondary level. This can also help to make school-to-work more attractive to employers and representatives of organized labor, who may be unable to provide skills training to employees.

Multiple Admissions Standards. The admissions standards of postsecondary institutions have a tremendous effect on whether or not young people enter a school-to-work program. Many postsecondary institutions--in particular four-year colleges and universities--typically use academic measurements and standardized test scores as the central criteria for accepting students. As a result, college-bound youth may believe that the changes in the amount of time spent in school-based learning resulting from school-to-work actually limit their ability to attend college.

Postsecondary institutions can address this perception by making a commitment to using multiple admissions standards and by working directly with secondary schools to help develop new methods of reporting academic and occupational competencies, such as student portfolios, which can include samples of student work as well as traditional high school transcripts. These methods can be extended to show how academic credit is applied to school-to-work participation, and how these skills relate to the basic academic courses that colleges require of applicants. Postsecondary institutions can also change student perception of school-to-work participation simply by placing increased value on integrated academic and occupational learning experiences at the secondary school level. Such strategies indicate to students and educators that multiple methods of learning are valued and are viewed as appropriate methods of instruction for college-bound youth.

Assessment and Follow-up. School-to-work initiatives measure their success by how well the system is serving students and helping them achieve positive outcomes. Partnerships between secondary and postsecondary institutions should tie into the larger school-to-work assessment efforts and build an awareness of and reliance on successful outcomes for students. Assessment systems follow students into postsecondary education and the labor market. With regard to postsecondary education, information should be collected on courses, majors, completion rates, work-based learning, and relation to high school school-to-work activities. Information on those who enter the workforce should focus on relation of current responsibilities to prior school-to-work activities, length of time on the job, earnings, and opportunities for training. In addition to student outcomes, partners should jointly develop methods to assess program impact. Specific criteria should be stated up front and reviewed periodically, so all partners know and are in agreement about their goals. Continuous, outcome-oriented evaluation and assessment will help ensure that secondary and postsecondary institutions stay on target in their school-to-work partnerships and will yield empirical data that can help prove the success of the system.

Professional Development. For school-to-work to effectively integrate academic and occupational learning, as well as create coordinated links between secondary and postsecondary institutions, partners must be offered support as they develop new skills. Teachers, administrators, employers, representatives of organized labor, and representatives of community-based organizations should be offered training as they learn new methods of teaching and additional ways to coordinate services with other institutions. Professional development activities can provide instructors with information on how to emphasize the workplace application of academic skills, and teach workplace supervisors and mentors how to focus on the academic content of hands-on learning experiences. This requires regular communication and interaction among teachers from each discipline, as well as from employers and representatives of organized labor, in the development of both curricula and teaching methods.

In addition, teachers and staff from both secondary and postsecondary institutions will have to work together to ensure that young people are provided with a continuum of substantive academic and occupational learning experiences. This can involve high school and college teachers working on teams with school administrators, employers, and representatives of organized labor to design and develop curricula. In addition, teachers can sit in on classes at other institutions to determine how to restructure and/or coordinate their teaching plans.

Effective Practices

Across the country, there are many innovative partnerships between secondary and postsecondary institutions which work together to help students succeed in their chosen careers. The following effective practices focus on two examples of such partnerships which use articulation agreements, innovative admission standards, joint evaluation and assessment efforts, joint development of curricula, and other mechanisms to weave together a smooth school-to-work system.

The University of Wisconsin System (UWS) has undertaken a variety of school-to-work initiatives and has been actively involved in state school-to-work implementation. An active partner in the school-to-work system since 1992, UWS is represented on a variety of state and local school-to-work partnerships, including the School-to-Work State Policy Group. UWS has also formed its own School-to-Work Coordination Group to ensure that the fourteen UWS institutions are working together in their implementation of school-to-work.

UWS has worked with its K-12 and Wisconsin Technical College (WTC) partners to create competency-based admission criteria for students. In this process, teacher evaluation teams use student portfolios, grades, and real work projects to complete individual student profiles. These profiles examine and assess student competency levels in social studies, science, math, English, and foreign language, and are sent jointly with traditional high school transcripts for use in determining admission to UWS.

In addition, UWS institutions have worked with the Wisconsin Technical Colleges to help WTC students transition more effectively into UWS baccalaureate programs. This has led to the development of over 200 articulation agreements that provide for the transfer of prior credits toward many UWS academic programs. Many of these efforts have been supported by two vocational research centers which provide UWS partners with research and technical assistance. A research arm of the UWS is working to formally evaluate the success of school-to-work students by following up with them in their postsecondary path, whether that is the workforce, technical college, or 4-year university.

The Greater Louisville Youth School-to-Work Initiative has actively engaged postsecondary institutions in its school-to-work system to provide young people with exposure to college and offer them greater opportunities to continue their education after high school. In Louisville, Western High School students begin participation in school-to-work in eighth grade, when they take field trips to Kroger Grocery Store and have guest speakers from Kroger come into their classrooms. In ninth and tenth grade, participants enter a program with a curriculum in retail sales and business, developed with input from the schools, Kroger, and Sullivan College, a local, private four-year postsecondary institution.

In their junior and senior years, students work 10 to 20 hours per week in paid on-the-job training experiences, and at the same time attend classes in business, marketing, and retail at Sullivan College. This exposes students to college-level coursework and further involves Sullivan in the development of integrated academic and occupational learning experiences.

Upon graduation from high school, students have the option to move on to Sullivan and work towards either certification and/or an associate degree. High school coursework is directly applied toward the degree to be earned at Sullivan. This has been made possible by the development of formal articulation agreements between Sullivan, Kroger, and Western High School, which develop clear paths from secondary to postsecondary institutions.

In addition, Sullivan has been an active partner in overall system and participant evaluation. Along with representatives of Western and Kroger, parents, teachers, and other members of the community, representatives of Sullivan serve on an Advisory/Evaluation Board. The Board is involved in the evaluation of student performance and overall system evaluation, and provides a postsecondary perspective to participant selection and program development.

Effective Practices

The University of Wisconsin System: Larry Rubin, System Academic Planner, 1624 Van Hise Hall, 1220 Linden Drive, Madison, WI 53706-1559 (608) 262-6717 lrubin@ccmail.uwsa.edu.

The Greater Louisville Youth School-to-Work Initiative: Jack Will, Executive Director, Kentuckiana Education and Workforce Institute, The Louisville Area Chamber of Commerce, 600 West Main Street, Louisville, KY 40202 (502) 625-0128.

Organizations

The American Association for Career Education (AACE) is a non-profit organization that connects careers, education, and work through career education for all ages and by advancing connections among representatives of education, business, industry, and the community. AACE supports a variety of educational initiatives, including school-to-work, career education policies, and community partnerships in education. 2900 Amby Place, Hermosa Beach, CA 90254-2216 (310) 376-7378.

The American Association of Community Colleges (AACC) provides a national focus and an agenda that promotes, supports, and advances the cause of its member colleges. AACC meets this mission by developing policy initiatives that promote a national agenda and identify educational and community challenges; advocating this agenda to a broad external constituency; researching to provide data, information, and analysis for community college concerns; providing educational services; and coordinating the efforts of community colleges and related organizations. One Dupont Circle, Suite 410, Washington, DC 20036-1176 (202) 728-0200 http://www.aacc.nche.edu.

The Association of Community College Trustees (ACCT) represents the over 6,000 elected or appointed officials who govern community, technical, and junior colleges in the United States and Canada. The purpose of ACCT is to strengthen the capacity of community, technical, and junior colleges to realize their mission on behalf of their students and communities. Major activities of ACCT include assisting boards of trustees in developing and affecting public policy for the achievement of the missions and goals of their institutions and providing trustees with the opportunity to acquire the skills and knowledge required to master their role as board members. 1740 N Street NW, Washington, DC 20036 (202) 775-4667.

The Business-Higher Education Forum (BHEF) at the American Council on Education is an association of business and university leaders that exists to foster constructive understanding between members of the group on issues that are of mutual concern and that influence the nation and the world. BHEF works to bridge the gap between the corporation and the campus while preserving the unique, traditional role of each. BHEF has provided information and analysis on such critical issues as economic competitiveness, education and training, and research and development partnerships. One Dupont Circle, Suite 800, Washington, DC 20036-1193 (202) 939-9345 bhef@ace.nche.edu http://www.acenet.edu/programs/BHEF/BHEF.html.

The Career College Association (CCA) is a national organization of private, postsecondary career colleges, schools, and other entities, established to foster policies that ensure equitable access for students to quality career and skill-specific education. CCA represents private postsecondary colleges in the U.S., Western Europe, the Caribbean, and the South Pacific that prepare individuals for careers in business, industry, and government. CCA's primary objective is to help member institutions achieve the highest possible standards of educational quality and service to their students. In addition, CCA works to improve the accountability and integrity of all institutions in the postsecondary education community. 750 First Street, NE, Suite 900, Washington, DC 20002-4241 (202) 336-6768 ccadl@access.digex.net.

The Center on Education and Work (CEW) is a research, development, and technical assistance unit of the University of Wisconsin School of Education, dedicated to improving linkages between education and work. In addition to policy research, evaluation, and development, CEW operates six development/technical assistance teams aligned with various components of the School-to-Work Opportunities Act. CEW also works with state and local practitioners, as well as secondary and postsecondary teachers, counselors, and school administrators, to design curricula and develop customized workshops and inservice training programs. 964 Educational Sciences, 1025 West Johnson, Madison, WI 53706 (608) 263-3696 http://www.cew.wisc.edu.

The Center for Occupational Research and Development (CORD) is dedicated to conducting research and developing educational strategies, materials, and services to equip learners with the academic foundation and flexible technical skills to enable them to function successfully in the contemporary workplace. CORD developed and maintains the National Coalition of Advanced Technology Centers, an organization of approximately 85 member community colleges, and the National Tech Prep Network. CORD developed two of the model National Voluntary Skills Standards Projects, and has conducted courses and seminars for teachers on school-to-work issues, contextual learning methods, and applied academics. CORD also developed and disseminates curricula that focuses on new and emerging technologies and programs. For postsecondary issues, contact Jim Johnson, CORD, P.O. Box 21689, Waco, TX 76702-1689 (817) 772-8756.

The Education Trust at the American Association for Higher Education serves as a national hub for the growing movement toward school/college partnerships, encouraging college and university leaders to initiate programs and assisting program managers and practitioners to improve their effectiveness. In addition, The Education Trust manages a wide range of local initiatives, providing long-term on-site assistance to local and state-level education and community leaders as they seek to mount and sustain K-16 reform strategies. One Dupont Circle, Suite 360, Washington, DC 20036 (202) 293-6440.

The League for Innovation in the Community College is committed to improving all aspects of community college operation through experimentation and innovation. The League promotes this mission by working as a catalyst, project incubator, and experimental laboratory for over 1,400 community college institutions in the United States. Active in the development of workforce preparation initiatives, the League has worked with community colleges to strengthen their links to other education providers. The League can refer practitioners to school-to-work systems that have developed connections with postsecondary institutions. 26522 La Alameda, Suite 370, Mission Viejo, CA 92691 (714) 367-2884 http://www.league.org/.

The National Association of Secondary School Principals (NASSP) provides professional resources for principals, assistant principals, and other school leaders attempting to promote the intellectual growth, academic achievement, character and leadership development, and physical well-being of youth. NASSP has undertaken a variety of initiatives to promote school-to-work, including sponsoring conferences and preparing publications. In addition, NASSP has worked to improve communication between schools, colleges, and other postsecondary institutions. Contacts: Dr. John Lammel, Director, High School Services; Mrs. Maryellen Parker, Director, Assistant Principal Services; Dr. Gwendolyn J. Cooke, Director, Urban Services n 1904 Association Drive, Reston, VA 22091-1537 (703) 860-0200 http://www.nassp.org.

The National Association of State Directors of Vocational Technical Education (NASDVTE) is the Washington-based organization of state vocational education agency heads committed to leadership and outstanding performance in vocational technical education. NASDVTE has a growing membership of over 200 senior state staff and concerned business, labor, and other education officials who share the directors' commitment to quality occupational education at the secondary, postsecondary, and adult levels. The Hall of States, 444 North Capitol Street NW, Suite 830, Washington, DC 20001 (202) 737-0303.

The U.S. Department of Education's Office of Postsecondary Education helps students set and meet challenging postsecondary educational goals and promotes excellence in postsecondary education. 4082 Regional Office Building, 7th and D Streets, SW, Washington, DC 20202 http://www.ed.gov/offices/OPE/index.html.

The U.S. Department of Education's Office of Vocational and Adult Education (OVAE) administers the funds distributed to States under the Carl D. Perkins Vocational and Applied Technology Education Act (Perkins Act) for vocational-technical programs offered in secondary and postsecondary schools. OVAE administers and provides services to the States and the field in response to the mandates of the Perkins Act. U.S. Department of Education, Office of Vocational and Adult Education, 4090 MES 330 C Street, SW, Washington, DC 20202 http://www.ed.gov/offices/OVAE/.

The U.S. Department of Labor, Bureau of Labor Statistics. Employment Outlook: 1994-2005 Job Quality and Other Aspects of Projected Employment Growth. Washington, DC: Government Printing Office, December 1995.

For additional information, please contact:
The National School-To-Work Learning and Information Center
400 Virginia Avenue, Room 210
Washington, DC 20024
Phone: 1-800-251-7236
Fax: 202-401-6211
E-mail: stw-lc@ed.gov
Internet: http://www.stw.ed.gov

Section III-C:
Plastics School-to-Work Programs in Michigan

1. **Van Buren County: Plastics Manufacturing**
2. **Kent County: Plastics Manufacturing Technology**
3. **Kalamazoo County: TEAM Plastics High School**
4. **St. Clair County: Academy for Plastics Manufacturing Technology**
5. **Oakland County: Manufacturing Academy of Plastics Sciences**

Van Buren County Plastics STW

Dave Anderson, Plastics Instructor
Van Buren Vocational-Technical Center
250 South Street
Lawrence, MI 49064
616-674-8001

The plastics program in Van Buren county is located at the Voc-Tech center, and is open to all 12 high schools. It has been in existence for 20 years since the beginning of the Center. The plastics lab is fully-equipped with a variety of equipment. They currently have 32 students: 16 in each of two sections that run for two hours. Approximately one half of the time is spent in class and lab activities.

The program is designed to be a two year course with co-op work at a plastics company during the second year. Many students take only one year. Both years include tours and job shadowing.

The course covers the set-up and operation of injection molding machines and most other plastics equipment. Curriculum includes major sections on applied math and applied science. Students may also enroll in the "Manufacturing Academy" for Plastics and receive dual credit articulated with Southwestern Michigan College or Kalamazoo Valley Community College.

They have an advisory committee that meets regularly which is made up of representatives from plastics companies, KVCC, and the placement coordinator from the school district.

The following attachments are included:

- brochure
- task list
- certificate

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Do you like...

- Working with your hands
- Making things
- Solving problems
- Taking things apart and then puttting them back together
- Learning how things work or how you can improve on a product

Facts

South Western Michigan is a major center for plastics production. The plastics industry is a multi-billion dollar business that is growing faster than most other industries.

Plastics are used in the biomedical field, the building trades, electronics field, food, clothing and packaging industries.

By the year 2000 plastics production will be three and a half times the volume of all metals combined.

The Van Buren Intermediate School District
is in compliance with State and Federal laws prohibiting
discrimination on the basis of race, color, religion, national
origin or ancestry, age, height, weight, sex, marital status or
handicap condition or disability.

Plastics

Manufacturing Cluster

Program Description

In the plastics program students learn the set-up and operation on all types of plastics processing equipment.

Job Titles

- Machine Operator
- Material Handler
- Machine set-up person
- Quality control person
- Plastics engineer
- Plastics technician

Further Training

Students can further their training by attending 2 year colleges and 4 year universities.

Skills Taught

Set-up and operation of the following:
- Injection machine
- Extruder
- Blow molder
- Thermoformer
- Compression machine
- Rotational molder
- Plastics materials
- Measurement

Options

- Plastics engineering
- Chemical engineering
- Mold making
- Marketing
- Consulting

Counselor Recommendations

____

____

Proposed Schedule:

Junior Year	*Senior Year*

Tech/Prep Possibilities After Graduation:

____

____

Parent/Guardian Approval______________________________

Date______________________

Please return to guidance office!!!

MANUFACTURING ACADEMY -- PLASTICS

Class Schedule
Course Descriptions
Requirements
Application
Counselor Recommendations

Van Buren Vocational-Technical Center
250 South Street
Lawrence, MI 49064

Manufacturing Academy – Plastics Schedule...

College credits to SMC & KVCC

Fall Semester		*Credits*
SMC Math 111 or 112	*Technical Math*	*3 Hours*
SMC Physics 103	*Technical Physics*	*3 Hours*
KVCC PLA 100	*Intro to Plastics*	*3 hours*
		9 Hours
Winter Semester		
KVCC PLA 115	*Injection Molding*	*4 Hours*
KVCC FDC 108	*Portfolio Development*	*1 Hour*
		5 Hours
Spring Semester		
Work Experience-contracting with Business and Industry		*2 Hours*
Total Credits for year		*16 Hours*

Qualifications for this program:

1. *Minimum grade point of 2.5*
2. *Minimum of C in Algebra*
3. *Good attendance*
4. *Successfully pass college math and reading entrance exam**
5. *Transportation to industrial site*
6. *Meet local school requirements for dual enrollment*

* *Students desiring dual enrollment at Southwestern Michigan College (SMC) must register for the class following the normal registration process. This process requires all students to take the Skills Assessment Test prior to registration.*

Course Descriptions

SMC Math 111 - Technical Math 1
Basic applied math concepts including: metric system, polynomials, ratio, proportion, geometry, and trigonometry.

SMC Math 112 - Technical Math II
This course is a continuation of MATH 111. Emphasis is placed on the use of the scientific calculator, applied trigonometry, applied vectors, applied geometry, applied algebra, and engineering computations.

KVCC PLA 100 Introduction to Plastics
An overview of the impact plastics has made in our world. Lecture topics include; history, health and safety considerations, environmental impact, and thermoset and thermoplastic materials. Processing methods used in manufacturing, decorating, fabrication, and design considerations will also be discussed.

KVCC PLA 115 Injection Molding
An introductory course in injection molding. Using lectures and a hands-on lab; machine identification, basic molding machine operations, safety, set-up procedures, trouble-shooting, and machine adjustments will be taught.

KVCC FDC 108 Portfolio Development
This course provides an alternative way for demonstrating learning and gaining academic credit. By using a formal portfolio, students will review life experiences, identify learning acquired outside the classroom, and request credit toward an educational goal.

APPLICATION -- Manufacturing Academy – Plastics

*Name*______________________________ *Grade*__________

*Address*____

*Phone*________________________ *School*_______________

*Career Goals:*____________________________________

*Educational Plans*__________________________________

dac plastics a CLUSTER PLVb

MANUFACTURING TECHNOLOGY CLUSTER

CATEGORY LIST FOR PLASTICS

TASK #	TASK NAME	JOB QUANTITY	JOB QUALITY
PROGRAM ORIENTATION			
MP0101	COMPLETE CENTER HANDBOOK		3.00
MP0102	COMPLETE PROGRAM OPERATION GUIDE		3.00
MP0103T1	MATH ASSESSMENT	2.00	3.00
MP0104T1	READING ASSESSMENT	2.00	3.00
SAFETY			
MP0401	UNDERSTAND SAFETY OF INJECTION MACHINE		3.00
MP0402	UNDERSTAND SAFETY OF EXTRUSION		3.00
MP0403	UNDERSTAND SAFETY OF BLOW MOLDING		3.00
MP0404	UNDERSTAND SAFETY OF COMPRESSION MOLDING		3.00
MP0405	UNDERSTAND SAFETY OF THERMO FORMING		3.00
MP0406	MAINTENANCE OF LAB		3.00
MP0407	MAINTENANCE OF EQUIPMENT		3.00
JOB SEEKING SKILLS			
MP0501	DISPLAY EVIDENCE OF CAREER PLAN (SHORT/LONG TERM GOALS/EDP)		3.00
MP0502	BUILD A LIST OF POSSIBLE EMPLOYERS		3.00
MP0503	CONTACT EMPLOYERS BY TELEPHONE		3.00
MP0504	COMPLETE A JOB APPLICATION		3.00
MP0505	COMPLETE A RESUME		3.00
MP0506	WRITE A COVER/APPLICATION LETTER		3.00
MP0507	PARTICIPATE IN A JOB INTERVIEW PROCESS SIMULATION		3.00
MP0508	DEVELOP A PORTFOLIO		3.00
APPLIED PLASTICS MATH			
MP0701	ADDITION OF WHOLE NUMBERS		3.00
MP0702	SUBTRACTION OF WHOLE NUMBERS		3.00
MP0703	MULTIPLICATION OF WHOLE NUMBERS		3.00
MP0704	DIVISION OF WHOLE NUMBERS		3.00
MP0705	ADDITION OF FRACTIONS		3.00
MP0706	SUBTRACTION OF FRACTIONS		3.00
MP0707	MULTIPLICATION OF FRACTIONS		3.00
MP0708	DIVISION OF FRACTIONS		3.00
MP0709	CONCEPTS OF DECIMAL		3.00
MP0710	CONCEPTS OF TOLERANCE		3.00
MP0711	CONCEPTS OF PERCENTS		3.00
MP0712	CONCEPTS OF RATIO		3.00
MP0713	CONCEPTS OF PERIMETERS		3.00
P0714	CONCEPTS OF AREA		3.00
MP0715	CONCEPTS OF VOLUME		3.00
MP0716	USE OF RULE		3.00

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TASK #	TASK NAME	JOB QUANTITY	JOB QUALITY
APPLIED SCIENCE			
MO0924V2	"INLAND STEEL" VIDEO	1.00	3.00
MP0901	IDENTIFIES EXAMPLES OF 6 MACHINES IN PROGRAM	1.00	3.00
MP0902	ASSEMBLES LEVERS	1.00	3.00
MP0903	CALCULATES MECHANICAL ADVANTAGE OF LEVER	1.00	3.00
MP0904	IDENTIFIES PATTERNS IN DATA ON LEVERS	1.00	3.00
MP0905	ASSEMBLES BLOCK AND TACKLE SYSTEM (PULLEY LAB)	1.00	3.00
MP0906	CALCULATES MECHANICAL ADVANTAGE OF PULLEYS	1.00	3.00
MP0907	IDENTIFIES PATTERNS IN DATA ON PULLEYS	1.00	3.00
MP0908	CALCULATES MECHANICAL ADVANTAGE OF WHEEL AND AXLE	1.00	3.00
MP0909	IDENTIFIES PATTERNS IN WHEEL AND AXLE DATA	1.00	3.00
MP0910	CALCULATES MECHANICAL ADVANTAGE FOR GEARS	1.00	3.00
MP0911	UNDERSTANDS HOW GEAR RATIOS CHANGE SPEEDS OF TOOLS	1.00	3.00
MP0912	WATCHED "ELECTRICAL SAFETY AT WORK" VIDEO	1.00	3.00
MP0913	MEASURES AC VOLTAGE WITH DIGITAL MULTIMETER	1.00	3.00
MP0914	MEASURES AC CURRECT WITH DIGITAL MULTIMETER	1.00	3.00
MP0915	MEASURES RESISTANCE WITH DMM	1.00	3.00
MP0916	CALCULATES BREAKER SIZE FOR CIRCUIT	1.00	3.00
MP0917	IDENTIFIES DIFFERENCES BETWEEN PARALLEL AND SERIES CIRCUITS	1.00	3.00
MP0918	CONSTRUCTS SIMPLE CIRCUITS WITH WIRES, SWITCHES, AND BULBS	1.00	3.00
MP0919	UNDERSTANDS ELECTRICAL TRANSFORMERS	1.00	3.00
MP0920	WROTE FORMAL LAB REPORT ON LEVERS	1.00	3.00
MP0921	WROTE FORMAL LAB REPORT ON PULLEYS	1.00	3.00
MP0922	WROTE FORMAL LAB REPORT ON WHEELS AND AXLES	1.00	3.00
MP0923	WROTE LAB REPORT	1.00	3.00
MP0924	IDENTIFIES STEPS IN STEEL PRODUCTION FROM MINING TO CONSUMER	1.00	3.00
MP0924V1	"WHERE STEEL BEGINS" VIDEO	1.00	3.00
MP0924V3	"THE ORIGINAL RECYCLERS" VIDEO	1.00	3.00
MP0925	IDENTIFIES ENVIRONMENTAL CONCERNS ABOUT MINING	1.00	3.00
MP0925W1	NPAK ARTICLES	1.00	3.00
MP0926	IDENTIFIES STEPS IN MINING OBTAINING FOSSIL FUELS	1.00	3.00
MP0926V1	"COAL, THE ROCK THAT BURNS" VIDEO	1.00	3.00
MP0926V2	"OIL, FROM FOSSIL TO FLAME" VIDEO	1.00	3.00
MP0927	LISTS WAYS THAT FOSSIL FUELS CAN BE CONSERVED	1.00	3.00
MP0928	LIST PROS/CONS OF ALTERNATIVE FUEL SOURCES	1.00	3.00
MP0928V1	"SOLAR CELLS" VIDEO	1.00	3.00
MP0928V2	"NUCLEAR ENERGY, THE QUESTIONS BEFORE US" VIDEO	1.00	3.00
MP0929	DETERMINES THE DENSITY OF A SOLID	1.00	3.00
MP0930	DETERMINES THE DENSITY OF A LIQUID	1.00	3.00
MP0931	DESIGNS ALUMINUM BOAT TO FLOAT (BUOYANCY)	1.00	3.00
MP0932	IDENTIFIES TEMPERATURE'S AFFECT ON VISCOSITY	1.00	3.00
MP0933	UNDERSTANDS TEMPERATURE'S AFFECT ON SIZE/THERMOEXPANSION	1.00	3.00
MP0934	COMPARES THE THERMO CONDUCTION RATE OF METALS	1.00	3.00
MP0935	IDENTIFIES METALS BY A SPARK TEST	1.00	3.00
MP0936	FINDS HARDNESS OF METAL (ROCKWELL TEST)	1.00	3.00
MP0937	TESTS DEPTH OF HARDENING ON A METAL	1.00	3.00
MP0938	UNDERSTANDS COMPRESSION FORCES	1.00	3.00
MP0939	UNDERSTANDS TINSEL STRENGTH	1.00	3.00

TASK #	TASK NAME	JOB QUANTITY	JOB QUALITY
APPLIED SCIENCE			
MP0940	IDENTIFIES STRESS PATTERNS IN MATERIAL WITH MICROSCOPE	1.00	3.00
MP0941	OBSERVES/ANALYSES FRICTION'S AFFECT ON A SURFACE (SANDPAPER)	1.00	3.00
MP0942	CALCULATES THE COEFFICIENT OF FRICTION	1.00	3.00
MP0943	UNDERSTANDS ACCURACY	1.00	3.00
MP0944	UNDERSTANDS PRECISION	1.00	3.00
MP0945	CALCULATES PERCENT ERROR	1.00	3.00
MP0946	USES 12" RULE PROFICIENTLY	1.00	3.00
MP0947	USES DIAL CALIPER PROFICIENTLY	1.00	3.00
MP0948	USES MICROMETER PROFICIENTLY	1.00	3.00
MP0949	DETERMINES IF AN ITEM IS WITH IN TOLERANCE	1.00	3.00
MP0950	CALCULATES THE PRESSURE NEEDED TO DELIVER WATER TO A GIVEN HEIGHT	1.00	3.00
MP0951	DETERMINES FORCE A CYLINDER CAN EXERT	1.00	3.00
MP0952	CALCULATES THE PRESSURE EXERTED BY AN OBJECT	1.00	3.00
MP0953	CALCULATES COST OF PRODUCTION	1.00	3.00
MP0954	UNDERSTANDS ABSENTEEISM'S AFFECT ON THE COST OF PRODUCTION	1.00	3.00
MP0955	IDENTIFIES WAYS TO STREAMLINE PRODUCTION	1.00	3.00
P0956	MEASURES AND CALCULATES SPEED OF OBJECT	1.00	3.00
P0957	MEASURES AND CALCULATES ACCELERATION OF OBJECT	1.00	3.00
MP0958	MEASURE RPM OF TOOL USING DIGITAL STROBOSCOPE	1.00	3.00
MP0959	CALCULATES WIRE FEED RATE OF WELDER	1.00	3.00
MP0960	IDENTIFIES PRIMARY AND SECONDARY COLORS OF LIGHT	1.00	3.00
MP0961	EXPLAINS HOW MONITORS AND PRINTERS PRODUCE COLORS	1.00	3.00
MP0962	EXPLAINS HOW LIGHTING CONDITIONS AFFECT PERCEIVED COLOR	1.00	3.00
MP0962Q1	QUIZ ON COLOR THEORY	1.00	3.00
MP0963	IDENTIFIES THE NATURE OF LIGHT	1.00	3.00
MP0964	IDENTIFIES DIFFERENCES IN OPTICAL DEVICES (LENS/MIRRORS)	1.00	3.00
INJECTION MOLDING MACHINE			
MP1001	OPERATION OF INJECTION MACHINE		3.00
MP1002	PERFORM SET UP OF INJECTION MACHINE		3.00
MP1003	PERFORM TROUBLE SHOOTING OF INJECTION MACHINE		3.00
MP1004	COMPLETE SET UP SHEET OF INJECTION MACHINE		3.00
MP1005	SOMPLETE PRODUCITON SHEET OF INJECTION MACHINE		3.00
MP1006	QUALITY INSPECT OF INJECTION MACHINE		3.00
MP1007	IDENTIFY PARTS AND FUNCTION		3.00
MP1008	RECOGNIZE INJECTION MOLDING DEFECTS		3.00
IDENTIFYING PLASTICS MATERIALS			
P1101	DESCRIBE BASIC POLYMER CHEMISTRY		3.00
MP1102	IDENTIFY MAJOR PLASTIC RESINS		3.00
MP1103	DESCRIBE LABORATORY ANALYSIS		3.00
MP1104	DESCRIBE THE METHODS FOR INDENTIFICATION OF PLASTICS		3.00
MP1105	DESCRIBE SOLID AND FLUID PROPERTIES OF PLASTICS		3.00

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TASK #	TASK NAME	JOB QUANTITY	JOB QUALITY
IDENTIFYING PLASTICS MATERIALS			
PLASTICS MOLD USAGE			
MP1201	IDENTIFY SAFETY PROCEDURES		3.00
MP1202	IDENTIFY MOLD PARTS		3.00
MP1203	DISASSEMBLE/ASSEMBLE MOLD		3.00
MP1204	PERFORM MOLD MAINTENANCE		3.00
MEASURING WITH PRECISION TOOLS			
MP1301	IDENTIFY PRECISION TOOLS AND THEIR FUNCTION		3.00
MP1302	MEASURE WITH CALIPERS		3.00
MP1303	MEASURE WITH A MICROMETER		3.00
MP1304	MEASURE WITH A GAGE		3.00
MP1305	MEASURE WITH A SCALE		3.00
MP1306	MEASURE WITH A TORQUE WRENCH		3.00
DESIGNING PARTS AND MOLDS			
MP1401	IDENTIFY DESIGN CONCEPTS		3.00
MP1402	DESIGN PROTOTYPE PART		3.00
MP1403	DESIGN/BUILD THEROFORMER MOLD		3.00
MP1404	DESIGN/BUILD INJECTION MOLD		3.00
MP1405	EVALUATE DESIGN PROBLEMS		3.00
DECORATING AND FINISHING PROCESSES			
MP1501	IDENTIFY PARTS OF ENGRAVER		3.00
MP1502	PERFORM SET UP OF THE ENGRAVER		3.00
MP1503	PERFORM MATERIAL PREPARATION FOR ENGRAVER		3.00
MP1504	OPERATE ENGRAVER		3.00
MP1505	IDENTIFY PARTS OF THE HOT STAMPER		3.00
MP1506	PERFORM SET UP OF THE HOT STAMPER		3.00
MP1507	OPERATE THE HOT STAMPER		3.00

Kent County Plastics STW

Ted Curtis, Plastics Instructor
Kent Career/Technical Center
1655 East Beltline, N.E.
Grand Rapids, MI 49505
616-364-8421

Kent county has 32 occupational programs at its Career/Technical center, which is open to 40 public and private high schools. The plastics class has been in existence for 5 years and includes a fully-equipped lab. They currently have 36 students in two sections that run for two and a quarter hours. Approximately 90% of the time is spent in lab activities.

It is designed to be a two year course but they accept both juniors and seniors. They even have several "13th year students". The course covers the set-up and operation of injection molding machines and most other plastics equipment. They have a very strong curriculum which includes 14 self-instructional modules. Administrators are currently working on implementing job shadowing, internships, and college articulation.

The following attachments are included:

- fact sheet
- list of modules

Manufacturing Cluster Programs:
CNC/CAM/Machining
Engineering Drafting/CAD
Furniture Manufacturing
Plastics Technology

Plastics Technology

Two-year Program

Program Description

The Plastics Technology program is designed for students considering the manufacturing of plastics as a career goal. An increasing variety of automobile parts, household goods, sports equipment, furniture, toys and machinery parts are formed by plastics. Western Michigan has more than 250 plastic processing companies. Career opportunities at all levels of technology and engineering are abundant.

Content Areas

- Basic understanding of and experience with blow-molding, compression-molding, decorating, extrusion, fastening and thermoforming
- Injection-molding machine setup, operation and nomenclature
- Machine maintenance and safety
- Material handling and inventory control
- Material testing
- Mold installation/removal, operation and nomenclature
- Quality control procedures, including Statistical Process Control
- Resin characteristics and properties
- Troubleshooting processing problems

Helpful Background Experience and Aptitudes

- Ability to problem-solve
- Good eye-hand coordination, manual dexterity
- High school classes in algebra, technology education
- KC/TC one-week *"Exploring Plastics"* seminar in 9th or 10th grade
- KC/TC one-day *"Physics of Plastics"* seminar for high school Physics students

Career Opportunities

- Machine Operator Apprentice: Blow-molding/Extrusion/Injection-molding
- Quality Control Inspector
- Secondary Processor
- Setup Technician: Mold/Process
- Statistical Process Control Worker
- Technician: Inventory Control/Material Handling
- *An apprenticeship program is available with a local company.*

Benefits for the College Bound

This program provides the student with beneficial skills to use while financing a college education. After completion of this program, a student may be granted advanced placement and/or college credit toward associate degree programs in Plastics Technology at Grand Rapids Community College and Ferris State University. This credit is awarded through an articulation agreement between these schools and Kent Career/Technical Center and may be granted based on competency testing and instructor recommendation.

Plastics Technology Modules

Blow Molding
1. Basic _____
2. SPC cost/time _____
3. SPC part specs* _____

Engraving
1. Basic _____
2. Advanced _____
3. CADD* _____

Extrusion
1. Basic _____
2. SPC through-put _____
3. Tube extrusion* _____

Fabrication
1. Basic* _____
2. Advanced-Student developed* _____

Fluidized bed coating
1. Basic _____
2. Product development* _____

Hot Stamping
1. Basic _____
2. Advanced-Tool development* _____

Hydraulic Press
1. Compression Molding _____
2. Flat panel laminating _____
3. Curved veneer laminating _____

Mold Installation:
1. Simulation _____
2. On machine* _____

Rotomolding
1. Basic _____
2. Tool development* _____

Supervision _____

Thermoforming:
1. Basic _____
2. Thermoforming/Casting _____
3. Mold Making/Casting* _____

Team Cluster Project
1. Basic-short term* _____
2. Advanced-long term* _____

Testing
1. Basic-tensile _____
2. Advanced-tensile* _____
3. Flex* _____
4. Experiments/Data Pro Manual* _____

Injection Molding

Computer simulation* _____
Basic-Jaco (conventional) _____
Jaco-RJG System* _____
Basic-33 ton Milacron (computer) _____
Basic-55 ton Milacron (computer) _____

Injection Molding: Advanced Modules
Do not have to be done in listed order

1. Weld/meld lines _____
2. Wrinkles, sinks and voids _____
3. Gate seal _____
4. Effects of regrinding _____
5. Optimum cycle time _____
6. Heaviest/lightest part production _____
7. Cavity filling (multiple cavity) _____
8. Post mold shrinkage/expansion _____
9. Warpage _____
10. Splay _____
11. Optimum injection speed _____
12. Statistical data collection _____
13. Design experiment _____

Technician _______________________
Session _________ Year 9__/9__
Home school _______________________
Program status: 1st. yr ___ 2nd. ___

* Not developed. Like to help develop?

Kent Intermediate School District

Kent Career/Technical Center

Certificate of Performance

in

Plastics Technology

is conferred upon

In Testimony thereof, this certificate is awarded on the fourth day of June, 1996

Instructor

Building Principal

THIS CERTIFICATE VERIFIES THAT________________HAS COMPLETED_____YEAR(S) OF TRAINING IN THE PLASTICS TECHNOLOGY PROGRAM. THIS STUDENT HAS COMPLETED_____ HOURS OUT OF A POSSIBLE_____ AND PERFORMS THESE SKILLS AT THE SPECIFIED LEVEL BELOW:

LEVEL GUIDE:

1	STUDENT INTRODUCED TO SKILLS
2	SKILLS ACCOMPLISHED WITH ASSISTANCE
3	SKILLS ACCOMPLISHED WITHOUT ASSISTANCE
4	ABILITY TO DEMONSTRATE SKILLS TO OTHERS

PERFORMS INJECTION MOLDING ON A COMPUTER CONTROLLED MACHINE INCLUDING CLAMP AND EXTRUDER SET UP, AND SHOT DEVELOPMENT............______

PERFORMS INJECTION MOLDING ON A CONVENTIONAL LIMIT SWITCH MACHINE INCLUDING CLAMP, AND EXTRUDER SET UP AND SHOT DEVELOPMENT............______

PERFORMS INJECTION MOLDING SIMULATION USING COMPUTER AND SOFTWARE....______

PERFORMS INJECTION MOLD CHANGING.....................................______

PERFORMS BLOW MOLDING INCLUDING SET UP OF TIMERS AND OPERATION ON MANUAL SEMI-AUTOMATIC AND AUTOMATIC CYCLE................................______

PERFORMS BLOW MOLDING CHANGING.......................................______

PERFORMS EXTRUSION INCLUDING OPERATION OF EXTRUDER, COOLING TANK PELLITIZER, PULL OFF UNIT, ROD AND TUBE DIE..........................______

PERFORMS EXTRUSION DIE CHANGING......................................______

PERFORMS THERMOFORMING INCLUDING SET UP AND OPERATION OF MACHINE ON SEMI-AUTOMATIC CYCLE TO PRODUCE PARTS..............................______

PERFORMS COMPRESSION MOLDING INCLUDING TIME, PRESSURE AND TEMPERATURE PROFILES REQUIRED TO PRODUCE PARTS................................______

PERFORMS COMPRESSION MOLD CHANGING...................................______

PERFORMS MATERIAL TESTING INCLUDING SET UP AND OPERATION OF COMPUTER CONTROLLED TESTING APPARATUS AND COMPUTATION OF RESULT IN UNITS REQUIRED..______

PERFORMS HOT STAMPING INCLUDING SET UP OPERATION OF THE MACHINE AND THE PRODUCTION OF STAMPED PARTS.................................______

PERFORMS ENGRAVING INCLUDING SET UP AND OPERATION OF A COMPUTER CONTROLLED ENGRAVER AND THE PRODUCTION OF ENGRAVED PARTS.............______

PERFORMS ROTATIONAL MOLDING INCLUDING MOLD AND MACHINE SET UP AND THE PRODUCTION OF PARTS...______

PERFORMS FABRICATION INCLUDING SHAPING, BENDING AND BONDING THERMOPLASTIC SHEET STOCK..______

PERFORMS STATISTICAL PROCESS CONTROL DATA COLLECTION/DEVELOPMENT.....______

UNDERSTANDS PROPERTIES AND CHARACTERISTICS OF BASIC PLASTIC RESINS...______

WE ENCOURAGE PROSPECTIVE EMPLOYERS TO CONTACT THE INSTRUCTOR AT
KENT CAREER/TECHNICAL CENTER 364-8421

Kalamazoo County Plastics STW

Rick Zinser, Plastics Instructor
Kalamazoo Public Schools
1220 Howard St.
Kalamazoo, MI 49007
616-324-1267

The plastics class in Kalamazoo is now in its third year. It is part of the Education for Employment program which has 20 different school-to-work classes and about 60% involvement of juniors and seniors throughout the county. As an alternative to the voc-tech structure, many of the EFE classes are located at businesses. The plastics class for example is held at a plastics company. It is open to all 11 high schools: students either drive or take a bus from their home school to the plastics class for two hours a day.

The plastics class is designed to be a two year program but is open to both Juniors and Seniors. Obviously the Seniors only get one year of the class, and some Juniors choose not to attend the second year. Those students taking the class for two years however are eligible for a summer internship between their Junior and Senior years and may work co-op during their Senior year. They may also take two introductory plastics classes at Kalamazoo Valley Community College for dual credit.

The plastics class uses a general manufacturing curriculum produced by the Ford Academy of Manufacturing Sciences. This accounts for about 60% of the material. The information on plastics is provided by weekly articles on plastics, company tours and speakers, two weeks at KVCC's plastics lab, and job shadowing at five sites. Students also complete work in other modules such as safety and employability skills.

Attachments include:

- EFE System overview
- Plastics Brochure
- Skills Certificate

Plastics Career

and

Job Opportunities

- Machine Operator
- Assembly and Decorating
- Setup Technician
- Material Handler
- Maintenance
- Mold Maker
- Scheduling
- Purchasing
- Sales
- Design Engineer
- Process Engineer

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How You Sign Up

**For more
Information
or
To Enroll
in the
EFE
TEAM Plastics
Class
See Your
High School
Counselor**

It is the policy of the Kalamazoo Valley Consortium that no person, on the basis of race, color, religion, national origin or ancestry, age, sex, height, weight, marital status, or handicap, will be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subject to discrimination in any program or activity for which it is responsible or for which it receives financial assistance from the U S Department of Education

TEAM Plastics

**Consider a Career in
Kalamazoo's Growing
Plastics Industry**

**Open to Juniors
and Seniors**

**Class Location:
Summit Polymers, Inc.
Sprinkle Road**

2 hours daily

Education for Employment

EfE

*Kalamazoo County
Central Service Area*

Technology
Engineering
Administration
Manufacturing

Plastics

Block Class

The EFE Plastics block class is open to 11th and 12th grade students in Kalamazoo County. Portfolio and career preparation are a major emphasis of the course. TEAM Plastics is a two-year program, and students are encouraged to enroll as juniors to effectively prepare themselves for a quickstart career or higher education in Plastics. The course offers an excellent foundation for anyone considering a career in the field of manufacturing. The TEAM Plastics class is located behind Summit Polymers Inc. on Sprinkle Road south of I-94. The course structure, materials, and activities are designed to expose students to a wide range of careers in plastics manufacturing.

Workplace Know-how Skills

The Plastics class is not a traditional lecture style course. Teamwork, business etiquette, and communication skills are emphasized throughout. One feature of the course is the many company tours, visitors, and college lab experiences. In addition, many employability skills are developed through business simulations.

Workforce Entry

Each year in the spring students have the opportunity to go on several job shadowing experiences at potential job sites. Externships (summer co-op employment) are available between 11th and 12th grades. Assistance is provided for graduating seniors for employment and/or college entrance.

College Credit

Students can receive four KVCC credits. One of these credits is earned for a plastics injection molding course which they attend at KVCC as a component of the TEAM Plastics program.

Topics Covered

Manufacturing Terminology

Principles of Economics

Manufacturing Functions

Production Processes

Measuring Quality

Data Collection Methods

Describing and Displaying Data

Quality Tools

Safety

Plastics Molding Machines

Molding Processes

Product Design

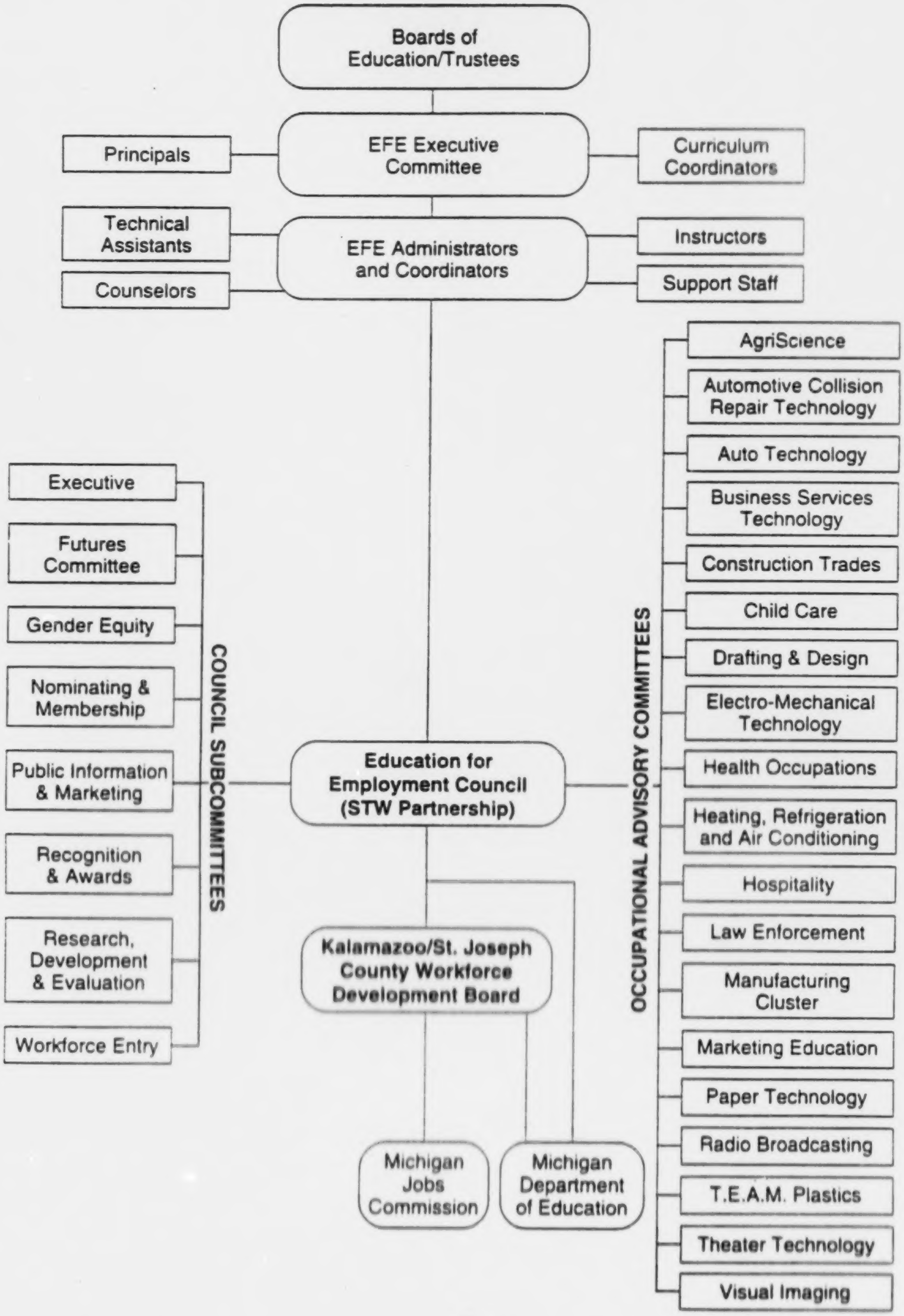
Recycling

This program has the approval of area plastic manufacturing companies

Education for Employment
EfE
Kalamazoo County
Central Service Area

Kalamazoo County Education for Employment

SYSTEM


Boards of Education/Trustees
Principals
EFE Executive Committee
Curriculum Coordinators
Technical Assistants
Counselors
EFE Administrators and Coordinators
Instructors
Support Staff
COUNCIL SUBCOMMITTEES
Executive
Futures Committee
Gender Equity
Nominating & Membership
Public Information & Marketing
Recognition & Awards
Research, Development & Evaluation
Workforce Entry
Education for Employment Council (STW Partnership)
Kalamazoo/St. Joseph County Workforce Development Board
Michigan Jobs Commission
Michigan Department of Education
OCCUPATIONAL ADVISORY COMMITTEES
AgriScience
Automotive Collision Repair Technology
Auto Technology
Business Services Technology
Construction Trades
Child Care
Drafting & Design
Electro-Mechanical Technology
Health Occupations
Heating, Refrigeration and Air Conditioning
Hospitality
Law Enforcement
Manufacturing Cluster
Marketing Education
Paper Technology
Radio Broadcasting
T.E.A.M. Plastics
Theater Technology
Visual Imaging

TEAM PLAST

The following outcomes make up the Education for Employment training program. Those marked by the teacher indicate competence by the student.

Course One: The World of Manufacturing

INTRODUCTION TO MANUFACTURING
____ Terminology
____ Problem solving strategies
____ Communication skills

PRINCIPLES OF ECONOMICS
____ Economic systems
____ The market environment
____ US economic indicators
____ Production possibilities
____ Supply and demand

HISTORY OF MANUFACTURING
____ Who's who in manufacturing
____ Evolution of manufacturing

MANUFACTURING SYSTEMS
____ Organizational systems
____ Organizational structures
____ Manufacturing functions
____ Integration of functions

MANUFACTURING PROCESSES
____ Planning for production
____ Production processes
____ Designing the process
____ Changing the process
____ Measuring the process

MEASURING QUALITY
____ Importance of evaluation
____ Meeting the standards
____ Variation
____ Information for decisions

CAREERS IN MANUFACTURING
____ Planning
____ Manufacturing careers
____ Case studies
____ Career forecasting
____ Marketing yourself

Course Two: Statistical Methods for Manufacturing Quality

INTRODUCTION TO STATISTICS
____ Descriptive statistics
____ Data collection methods
____ Variation
____ Reliability

DESCRIBING DATA
____ Frequency tables
____ Normal distribution
____ Measures of central tendency
____ Quartiles
____ Standard deviation
____ Z scores

DISPLAYING DATA
____ Histograms
____ Stem and leaf plots
____ time series plots
____ Comparing variables

QUALITY TOOLS
____ Cause and effect diagrams
____ Check sheets
____ Histograms
____ Pareto diagrams
____ Scattergrams
____ Flow charts
____ Control charts

THINKING STATISTICALLY (CASE STUDIES)
____ Analyzing the adequacy of data
____ Sources of data
____ Other factors affecting the data
____ Methods of analysis

BASIC PLASTICS SKILLS
____ Molding machine functions
____ Set-up and run molding machine
____ Molding cycle
____ Plastic materials
____ Assembly operations
____ Measuring parts
____ Identifying common defects
____ Part and mold design

ACADEMIC SKILLS
____ Work study habits
____ Listens and follows directions
____ Makes good use of time
____ Reading technical papers
____ Writing reports
____ Basic statistics

SAFETY AWARENESS
____ Understands potential hazards
____ Follows basic safety rules

INTERPERSONAL SKILLS
____ Making verbal presentations
____ Follows business etiquette
____ Leads and participates in team problem solving
____ Respects diversity
____ Demonstrates initiative
____ Accepts constructive criticism

EMPLOYABILITY SKILLS
____ Target and research companies
____ Prepare a resume and portfolio
____ Complete employment application
____ Complete a job interview
____ Take pre-employment tests
____ Write a thank-you letter

COMPUTER SKILLS
____ Proficient in Word Perfect
____ Proficient in Minitab (statistics)

INSTRUCTOR COMMENTS:

St. Clair County Plastics STW

Fred Stanley, Director
Career and Technical Education
Academy for Plastics Manufacturing Technology
P.O. Box 5001
Port Huron, MI 48061
810-364-8990

The Plastics Academy in St. Clair is chartered by the Intermediate School District. It began operations in September 1996 and is open to all 7 high schools in the district. The program has a school-within-a-school structure and is held at the Technical Education Center at the ISD. Like other programs, it is a two-hour class for two years with a summer internship between 11th and 12th grades. Business partners include the four major plastics companies in the area which have provided equipment, instructors, and work-based learning opportunities.

Attachments include:

- Publicity brochure
- Teacher job description
- Curriculum outline

The Academy for Plastics Manufacturing Technology

Plastics is one of the fastest growing industries in the nation. Through the **Academy for Plastics Manufacturing Technology**, students can explore and prepare for the careers of tomorrow.

The Academy combines the best that business and education have to offer. Academy students have the opportunity to spend half of their day learning at their home school, and half of their day learning from industry professionals in a classroom or on an actual job-site.

Academy partners include:

- Blue Water Plastics, Inc.
- Huron Plastics Group, Inc.
- Mohawk Plastics, Inc.
- Pine River Plastics, Inc.
- St. Clair County Intermediate School District
- St. Clair County Community College
- Ferris State University

Non-Profit Org.
Bulk Mail Rate
Permit #31
Marysville, MI

Academy for Plastics Manufacturing Technology
P.O. Box 5001
Port Huron, MI 48061-5001

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SUCCESS

Career Options

INCOME

...Sound Interesting?

Look around you. From your CD player to telephone, your computer or car, plastics play an important and necessary role in your life.

By enrolling in the **Academy for Plastics Manufacturing Technology**, you can begin to explore this exciting industry while continuing your high school career. Whether your interests are in computers, engineering, plastics processing, or quality control, the **Academy** offers something for you.

A public school open to St. Clair County high school juniors and seniors, the **Academy** allows students to spend half the school day at their home school and half learning from industry professionals. Paid internships enable students to earn money and high school credit at the same time. And perhaps best of all, employment is guaranteed to students who complete the Academy's program.

Career Options

From the first day, **Academy** students will realize that they are not in just another class. Their learning will include...

Leading Edge Skills - teamwork, problem-solving, and continuous job improvement - skills that will bring good wages and benefits now as well as in the future.

Career Options - explore many career paths, including engineering, machine maintenance, CAD, quality control, plastics processing, and more. Choose to start a good paying job immediately after high school graduation, or pursue advanced training through apprenticeships and college. You'll gain the skills and experiences to do both!

Learn by Doing - your studies won't be confined to book work - through hands-on learning experiences you'll explore subjects like bluep[illegible] reading, injection molding, compute[illegible]lications, quality assurance, and machine operation

Career opportunities are waiting for you in one of the nation's hottest industries - plastics. The **Academy for Plastics Manufacturing Technology**... it's here, are you ready?

Enrolling in the **Academy** is easy, but you need to act fast as space is limited. To learn more about the **Academy for Plastics Manufacturing Technology**, talk to a high school counselor or call Fred Stanley at 810/364-8990.

Academy
for Plastics
Manufacturin[illegible]
Technology

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NOTICE OF VACANCY

PERSONNEL OFFICE

INTERMEDIATE SCHOOL DISTRICT OF ST. CLAIR COUNTY
P. O. BOX 5001 • PORT HURON, MI • 48061-5001

Joseph A. Caimi, Supt.

ACADEMY FOR PLASTICS MANUFACTURING TECHNOLOGY TEACHER/COORDINATOR

The Academy for Plastics Manufacturing Technology is a public school academy chartered by the St. Clair County Intermediate School District. The academy is governed by its own Board of Education and is dedicated to educating world class manufacturing employees.

Academy students participate in a year-round program designed to prepare them for careers in plastics manufacturing with options for continuing education in traditional two-year or four-year college programs, apprenticeships, or industry sponsored training.

POSITION SUMMARY:

The Academy for Plastics Manufacturing Technology anticipates instructional openings for the delivery of a unique educational experience in plastics manufacturing technology. The curriculum will feature a non-traditional approach to classroom instruction, as well as a work-based learning component that will become progressively challenging as the program continues over a two year period.

The Academy will emphasize applied academics concepts in math, communiction and science, as well as the latest advancements in the use of technology in the workplace.

QUALIFICATIONS:

- State of Michigan secondary teaching certificate with appropriate vocational endorsement in related manufacturing area or
- State of Michigan secondary teaching certificate in math and/or science.

Posted Internally:

The Board of Education of the St. Clair County Intermediate School District complies with all federal and state laws and regulations prohibiting discrimination and with all requirements and regulations of the United States Department of Education and the Michigan State Department of Education.

It is the policy of the Intermediate Board of Education that no person on the basis of sex, race, color, religion, national origin or ancestry, age, marital status, or handicap shall be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program, employment practice, or activity for which it is responsible or for which it receives financial assistance from the United States Department of Education or the Michigan State Department of Education.

All new hires are subject to an employment entrance physical exam including drug and alcohol testing and fingerprinting background check with law enforcement agencies.

Rev. 7/1/94

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ESSENTIAL RESPONSIBILITIES:

- Assume leadership role in development of applied academics and manufacturing curriculum.
- Work with plastics industry to ensure that curriculum content and delivery are appropriate for both student and industry.
- Continually evaluate curriculum and modify based upon abilities and past achievements of students and industry demands.
- Develops and maintains a competency-based instructional program which incorporates a project or "invention" component.
- Maintains accurate and complete student records which meet State of Michigan standards.
- Provide accurate and complete student assessment.
- Coordinate school-based learning activities with work-based learning activities.

THIS LIST OF ESSENTIAL RESPONSIBILITIES IS NOT EXHAUSTIVE AND MAY BE SUPPLEMENTED AS NECESSARY.

RELATED RESPONSIBILITIES:

- Works cooperatively with St. Clair TEC staff and administration.
- Develops positive rapport with plastics manufacturing community to ensure appropriate feedback regarding curriculum content, design, and delivery.
- Properly maintains lab and equipment to ensure safe learning environment.
- Follows policies and procedures as established by the Academy.
- Takes active part in recruitment of new students.

CONDITIONS OF EMPLOYMENT:

Employment Date:	Immediately
Length of Contract:	Year-round
Salary:	Commensurate with education and experience
Fringe:	Teacher retirement and negotiated benefit package.

PROCEDURE:

Send letter of interest to:

Frederic C. Stanley
Academy for Plastics Manufacturing Technology
499 Range Rd., P.O. Box 5001
Port Huron, MI 48061-5001

Curriculum Delivery Model

First Semester - Fall

- -Orientation to Plastics Manufacturing
- -Safety
- -Introduction to Machine Operation
- -Introduction to Quality Assurance
- -Communication
  - team building
  - problem solving
  - personal skills
  - intro to employability
  - oral and written skills
  - workplace ethics/culture
- -Integration of Academics
  - applied math, science, & technology
- -STW Transition Activities
  - mentoring, job shadowing
  - non-paid internships

↓

Performance Testing

↓

Second Semester - Winter

-Injection Molding-Processing
- materials/physical properties
- troubleshooting
- maintenance
- CNC programming

-Quality Assurance
- Geometric Dimension & Tolerance
- Blueprint reading

-Integration of Academics
- applied math, science, & technology

-STW Transition Activities
- mentoring, job shadowing
- non-paid internships

-Invention Convention

↓

Third Semester - Summer

-Paid Internship (8 weeks)
- weekly reporting meetings held at manufacturing facilities
- discussion topics predetermined for each week

↓

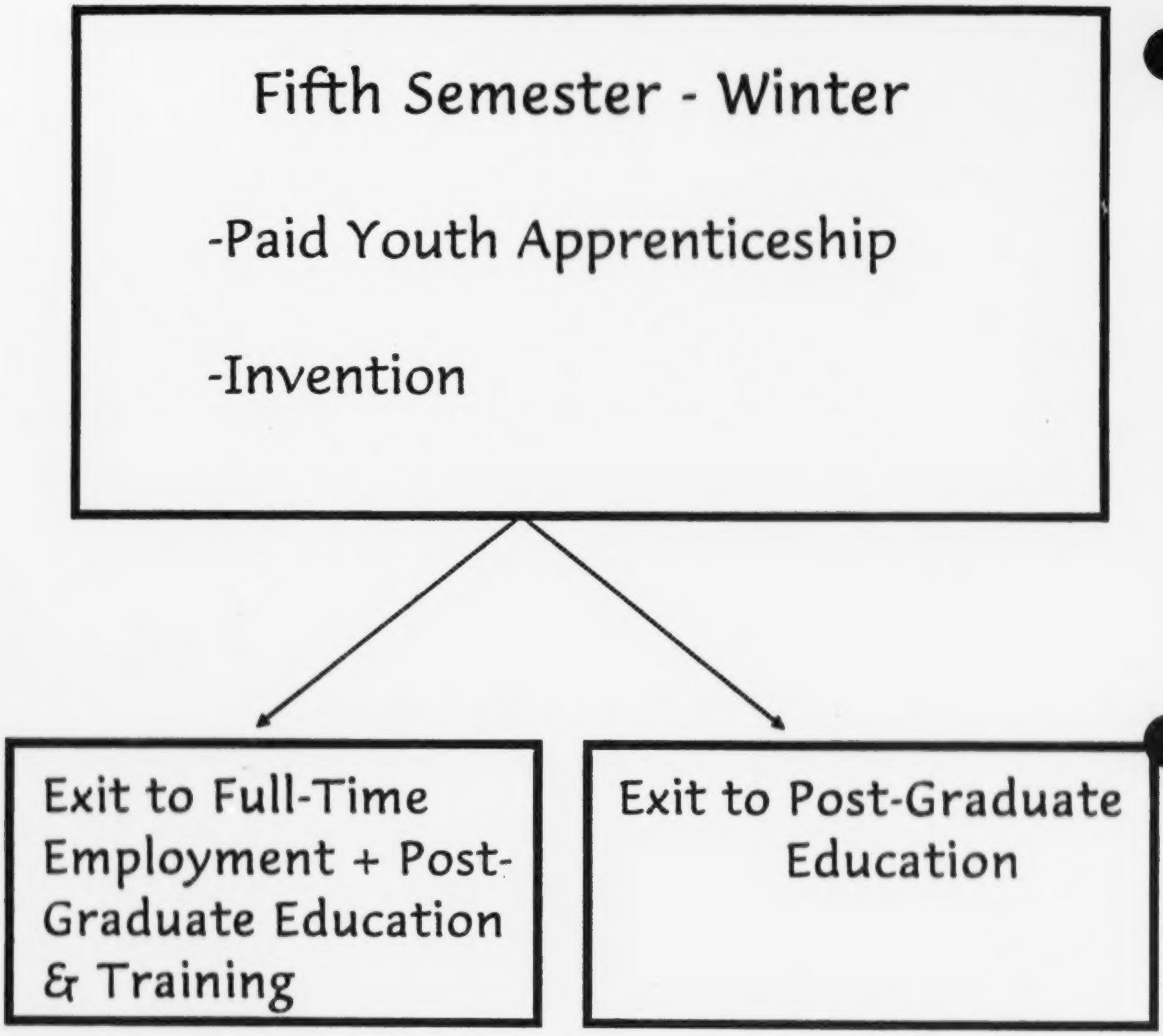
Performance Testing

Fourth Semester - Fall

-80% work-based learning
    - Paid Youth Apprentice

-20% seminar-based learning
    - Quality Assurance
    - Secondary Operations
    - Tooling
    - Manufacturing Process

Performance Testing



Fifth Semester - Winter

-Paid Youth Apprenticeship

-Invention

Exit to Full-Time Employment + Post-Graduate Education & Training

Exit to Post-Graduate Education

Work-based Activities:

- Job Shadowing
- Tours
  - Huntsman
  - Individual partner's manufacturing sites
  - Dow Chemical
- Conferences
  - Society for Plastics Industry (SPI) - regional seminar
  - SPI/State of Michigan Plastics Summit
- Internship/Apprenticeship

Invention Concept

Integrated Academics

Educational Partnerships

- Local School Districts
- Community Colleges
- Universities

Industry Driven

- Mentoring
- Speaker bureau
- Curriculum design
- Equipment/Material donations
- Adjunct faculty

Oakland County Plastics STW

Linda Visnaw, Director
Manufacturing Academy of Plastics Sciences
c/o Libralter Plastics, Inc.
3175 Martin Road
Walled Lake, MI 48390
810-669-4900

Starting this year, the MAPS in Oakland County combines the school-to-work concept with industry training. Their mission is to serve three groups with three levels of training: high school seniors, new employees, and existing employees.

High school students will enroll in a two year program similar to the other county programs. They will combine academic core requirements, manufacturing, and plastics technology. See the list of MAPS Competencies. The curriculum will be integrated with immediate applications in a lab setting, the same equipment used for the higher levels of training.

New employees of plastics companies require a systematic training effort, and studies show that an effective orientation reduces turnover significantly. However it is often difficult to accomplish because of time pressures and the availability of production equipment. In response to this need, the MAPS academy will provide an eight day training program for new employees. See the New Employee Program Modules.

Existing employees of plastics companies also need additional training as they advance. The academy will provide a series of courses, such as SPC and Communications, to fill this need.

Attachments include:

- MAPS Brochures
- High School Competencies
- New Employee Curriculum

Finally...
Training Programs Developed by the Plastics Industry for the Plastics Industry

Plastics Manufacturers are leading the way as they work with local education institutions. MAPS is intended to ensure the appropriate, "hands on" training environment supportive of a quality plastics work force.

You are invited to join this coalition of leading Plastics Manufactures in ...

... molding Michigan's future.

You Can Mold the Future Work Force ...

through Membership in MAPS !!!

- **Decrease turnover**
- **Enable current employees to pursue career goals**
- **Use your training dollars more efficiently**
- **Bring programs designed to shape the plastics work force to your site**

MAPS is a unique collaborative effort linking Plastic Manufacturing Science and all levels of Education.

Programs Begin
Winter 1996

Don't miss this opportunity...

Call: Michael Clancy
Libralter Plastics
810-669-4900

MAPS

Manufacturing Academy of Plastic Sciences

... Molding Michigan's Future

Membership Application

Entry Level Training...

Preparing job ready workers for Plastics Manufacturing.

..and Much More!!!

Planned programs of study designed to enhance the current employee's career goal.

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Molding Michigan's Future

MAPS Manufacturing Academy of Plastic Sciences

The Goal is ...
Improved Quality and Productivity

Why should *you* become a MAPS Member?

• •

...Are you concerned about turnover?

...Are your "Plastics Training" needs being met?

• •

Members will access:

- **A New Hire - Entry Level Training Program using a competency based curriculum designed to increase success and reduce turnover.**
- **A variety of training opportunities providing cost effective solutions. Classes are offered at MAPS locations or customized and brought to your site. Planned programs increase your employee skill level. Community College and University partnerships sup[illegible]rt industry specific training.**

New Employee - Entry Level Training will focus on:

- ***Interpersonal Communication and Teamwork***
- ***Business Planning and Operation***
- ***Employability Skills***
- ***Technical Knowledge***
- ***Safety, Health, Environment***

Existing Employee Training Support will focus on:

- ***Leadership***
- ***Management***
- ***Technical Knowledge***

"Hands on" programs meet the needs of the Plastics Industry by providing training that will:

- **Promote team concepts**
- **Enhance quality standards**
- **Present the latest technology**
- **Be career focused**
- **Measure industry driven competencies**

Employers want people who are:
- Problem solvers
- Team players
- Good communicators

MAPS is the place [illegible]velop these skills.

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MAPS Manufacturing Academy of Plastic Sciences

...Molding Michigan's Future

MAPS will launch it's first group of course offerings in the Winter of 1997. These programs are cost effective, and customized to meet the needs of plastics manufacturing. Designed and taught by industry professionals, training classes will be offered at times which accommodate the three shift schedule.

Watch for a brochure detailing times, dates, fees, and location.

• •

Train the Trainer — 12 hrs

Meet the QS9000 Certified Trainer requirement as theory and practice come together. First level supervisory staff benefit from the hands on approach. Designed to be held at your site with on the floor practice and feedback.

Basic Math for S.P.C. — 8 hrs

Reinforce basic Math concepts as they apply to Statistical Process Control. Understand the importance and value of this quality tool.

S.P.C. I & II — 8 hrs each

Continue to develop understanding and skill as charts and graphs define the theory and practice of SPC.

Blueprint Reading I & II — 8 hrs each

Essential to processes throughout manufacturing, this series of classes is a must for those involved in everything from maintenance to estimating.

Interpersonal Communications — 12 hrs

Understand the process of communication as you practice using these skills. Learn your communication style and how it effects your life.

The Entry Level Training [illegible]rogram

is scheduled to being as soon a[illegible] PS facility location is secured

• •

Industry "Know How" makes the difference!

As a Junior ...
Prepare for this program by taking advantage of Manufacturing Tech programs at your local High School or Tech Center.

The hands-on curriculum is supported by site visits and job shadowing at some of Southeastern Michigan's most productive Plastics Manufacturing Companies.

As a Senior ...
Spend 1/2 of your day at the Academy. Skills learned in CAD/Design, Electronics and Machine Trades prepare you for Plastics Internship opportunities.

After graduation placement in the industry and/or higher education is the next step.

Get ready to shape your future!

- **Be part of one of the fastest growing industries in the country today**
- **Get ready to compete in this high tech job market**
- **Go to classroom training and hands on experience in a facility designed to shape the plastics workforce**

MAPS is a unique collaborative effort linking Plastic Manufacturing Science and all levels of Education.

Classes begin Spring 1997

Interested ???

Call: (810)858-2165

It is the policy of Oakland County Schools that no person, on the basis of race, color, religion, national origin or ancestry, age, sex, height, weight, marital status, or handicap, will be discriminated against, excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination in any program or activity for which it is responsible or for which it receives financial assistance from the U. S. Department of Education.

MAPS

An environment where students prepare for careers in Plastics Manufacturing

Manufacturing Academy of Plastic Sciences

A Summer Job...
Summer employment before the Senior year

...and Much More!!!
Successful graduates of the MAPS Academy Program are guaranteed placement

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OSTWP
Oakland School-to-Work Partnership
Partners in Plastics
Partners in Progress

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(810) 858-2165
FAX (810) 858-2024

OSTWP Mission: To create, through partnerships, a system of opportunities that prepares a productive workforce to compete in a global economy.

OSTWP Mission: To create, through partnerships, a system of opportunities that prepares a productive workforce to compete in a global economy

High Paying Technical Opportunities are Waiting for You!!!

- Machine Operator
- AssemblyTech
- Process Tech
- Setup Tech
- Material Handler
- Quality Controler
- Mold Maker
- Lab Tech

Potential Engineering Careers in:

Quality Systems
Product Design
Polymer Chemistry
Packaging

MAPS Manufacturing Academy of Plastic Sciences is conviently located in Southwestern Oakland County.

Graduates of MAPS will be prepared for a national plastics certification exam. Developed by SPI, the first exam is scheduled for 1998

The MAPS Curriculum blends academic and work based learning activities including:

- ***The World of Manufacturing***
- ***Statistical Methods for Manufacturing***
- ***Quality issues***
- ***Workplace Technologies and Applications***
- ***Case Studies in Plastics Manufacturing***
- ***Job Shadowing***
- ***Internships in Plastics careers***

To be accepted at MAPS a Student must:

- Be a Senior with career goals
- Be punctual and have excellent attendance
- Be drug free
- Apply, submit letters of recommendation, and interview
- Follow employer's guidelines for:
  - Health
  - Safety
  - Dress code
- Follow the curriculum and participate in work-based learning
- Work with the on site mentors

This opportunity is for you if:

- You work well in teams
- You are creative and enjoy challenges
- You value quality
- You enjoy working with the latest technology
- You want a career with potential

Employers want people who are:

- Problem solvers
- Team players
- Good communicators

MAPS is the place to develop these skills

Chart your future with MAPS

See your School Counselor or Call:

(810)858-2165

Suggested competencies for MAPS 11-12 grade

I. Academic core requirements, including, but not limited to:
    - Math
        - introduction to statistics
        - SPC
    - Science
        - physical properties
        - chemical properties
        - basic scientific method
    - Communications
        - interpersonal
        - teamwork
        - listening/speaking/writing/reading

    - Business/Economics
        - customer service

II. Manufacturing Core

A. quality assurance

B. Safety in the workplace

C. Equipment Maintenance
    - housekeeping
    - recordkeeping

D. Manufacturing technology

E. Supervision
    - from two points of view

III. Plastics Manufacturing technology

A.History

B.Introduction to materials
- thermal sets
- thermal plastics

C.Supply
- Major types of plastics
- basic properties
- uses

D.Safety for plastics
- Material Safety Data Sheets

E. Manufacturing Techniques
1. Injection
    - part handling
    - deflashing
    - defect recognition

2. Blow molding
3. thermal forming
4. extrusion

F. Press Technology

G. Mold Making

H. Assembly

I. Material handling
- Identification
- mixing
- regrind

J. Recycling/reuse

Plastics Learning Centers
C:\MLC\WORD\ACADEMY\"CURRIC01"

Michael L. Clancy
Nov. 19, 1996

MAPS CURRICULUM
New Employee Program Modules
Eight-Day Sequence (Example)

Day #1	Careers	I	Plastics Career Prep
	Mfg. Basics	I	Manufacturing 101
Day #2	Careers	I	Teamwork I
	Mfg. Basics	I	MMM-I (Machine, Mold, Material)
Day #3	Quality	I	Quality Control - SPC + Products
	Mfg. Lab	I	Injection Molding I
Day #4	Careers	II	Teamwork II
	Mfg. Lab	II	Injection Molding II
Day #5	Careers	III	Communications
	Mfg. Basics	II	MMM-II (Machine, Mold, Material)
Day #6	Mfg. Lab	III	Assembly Operations
	Mfg. Lab	IV	Secondary Operations
Day #7	Quality	III	Problem Solving
	Mfg. Lab	V	Injection Molding III
Day #8	Quality	II	Quality Systems - QS9000 +
	Mfg. Lab	VI	Injection Molding IV

Michigan School-to-Work Resources

Section III-D:
MOIS and MCCTE Resources

- The Michigan Occupational Information System (MOIS) is widely used in high schools for career information. As their Homepage shows, the system helps students identify career interests and provides information on many occupations and schools. The web site is **http://isd.ingham.k12.mi.us/mois**. Some of the more common occupations have additional descriptions called MOIScripts. The one for Plastic Products Manufacturing Worker is shown in an abbreviated version. The complete MOIScript #216, which is available on high school computers, is also included here because of its relevance to plastics school-to-work. However, the information provided may not portray the **increasing technology, worker skill levels, and career opportunities** in the plastics industry so an MPIR Update has been added. MOIS is also working on a new multimedia presentation to help Expose Students to the World of Manufacturing.

- The Michigan Center for Career and Technical Education (MCCTE) contains a **school-to-work resource bank** at Michigan State University. The Center houses over 6,000 items including curricula, education units, and videos, most of which can be borrowed free of charge. This is an excellent resource for potential school-to-work partners. Contact the center at **1-800-292-1606.** Their web site is **http://mccte.educ.msu.edu**.

  A plastics manufacturing technology task list by MCCTE is cited in Section 6 on integrated curriculum.

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Welcome to the
Michigan Occupational Information System

Michigan
Occupational
Information
System

Ingham Intermediate School District
611 Hagadorn Road
Mason, MI 48854
Phone: (517) 244-1338
Fax: (517) 676-3399
Contacts in the MOIS Office

This page has been accessed
2248 times
Courtesy of the Web-Counter

- Self-Assessment Career Search
  Identify your interests and the computer will show you which career clusters your likely to succeed in.
- Career Information
  Over 2000 careers are contained in 434 MOIScipts and catagorized into 12 career clusters.
- Michigan Schools
  Information on public, private, and speciality schools in Michigan.
- Training Information
  Last year 1400 lucky users received training. Follow this link to find out upcoming training dates.
- Product Information
  Want to know more about M.O.I.S. and the products we offer?

M.O.I.S. is produced with help from the following organizations:

Ingham Intermediate School District has the contract to produce MOIS and MOIS related products from the Michigan Jobs Commission.

MICHIGAN JOBS COMMISSION

Our national graduate, undergraduate, vocational/technical schools and financial aid information is provided from Peterson's Education Center.

PETERSON'S EDUCATION CENTER
ON-LINE TO THE FUTURE

Questions or Comments call 517-676-1051 or email the MOIS office.

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Michigan Occupational Information System
Miniscript #216 - Plastic Products Manufacturing Worker

Plastic Products Manufacturing Workers fabricate, mold, form, or cast plastic materials into articles such as shower curtains, eyeglass frames, kitchenware, television cabinets, personal computer parts, packaging and shipping containers, and automotive parts.

General Job Tasks

- Weighs and mix resins, plasticizers, solvents, and color matter
- Fill machines with premixed plastic materials
- Set up molds of all sizes in a variety of machines
- Operate molding, compression, extrusion, and other machines
- Scrape, cut, fill, and sand molded, laminated, or machined plastic products to remove excess material of all kinds
- Tend power-driven circular and abrasive saws to cut plastic sheets, rods, or tubes to specified dimensions
- Operate spray painting equipment to coat plastic parts with various finishes
- Assemble prefabricated parts by hand or machine tools
- Examine products for scratches, burns, and color defects
- Place finished parts in containers

Work Environment

- In Plastic Products Plants or departments, the production or shop supervisor directs and coordinates the activities of Workers engaged in casting, molding, fabricating, and inspecting plastic products. Machine operators are usually responsible for training helpers.
- Working conditions in plastic plants are good when compared with factory work in general. Plants are often modern, well lighted, and adequately ventilated. Molding departments may be noisy and warm.
- Molding-machine operators often wear gloves, since they handle hot

  plastic pieces, and hand finishers wear steel mesh gloves when trimming products with a razor knife. In laminating departments, odors from laminating solutions may be disagreeable, and heat from presses may be uncomfortable. The accident rate in this occupation is about the same as that for all manufacturing.
- The workweek for most Plastics Workers is 40 hours. They may work any one of three separate shifts. Some Workers may rotate from one shift to another.
- Some overtime may be necessary from time to time to meet production deadlines. The average weekly number of overtime hours worked was 2.3 in late 1994.

| Search for Michigan schools which offer programs supporting this occupation |

MOISCRIPT #216 - PLASTIC PRODUCTS MANUFACTURING WORKER

Plastic Products Manufacturing Workers fabricate, mold, form, or cast plastic materials into articles such as shower curtains, eyeglass frames, kitchenware, television cabinets, personal computer parts, packaging and shipping containers, and automotive parts.

NATURE OF THE OCCUPATION

Plastic Products Manufacturing Workers may:

Weigh and mix resins, plasticizers, solvents, and color matter

Fill machines with premixed plastic materials

Set up molds of all sizes in a variety of machines

Operate molding, compression, extrusion, and other machines

Scrape, cut, fill, and sand molded, laminated, or machined plastic products to remove excess material of all kinds

Tend power-driven circular and abrasive saws to cut plastic sheets, rods, or tubes to specified dimensions

Operate spray painting equipment to coat plastic parts with various finishes

Assemble prefabricated parts by hand or machine tools

Examine products for scratches, burns, and color defects

Place finished parts in containers

Plastic Products made may include:

- Food casings
- Pipes & tubes
- Insulated wire
- Suitcase shells
- Toys, film & sheets
- Packaging containers
- Floor & wall coverings
- Foamed plastic products
- Personal computer parts
- Plastic automobile parts
- Plastic dinnerware & tableware
- Plastic office furniture parts

OCCUPATIONAL SPECIALTIES

Plastic Products Manufacturing Workers may specialize in these areas:

INJECTION-MOLDING-MACHINE OPERATORS set up and operate machines that cast products from thermoplastic materials.

EXTRUDER OPERATORS set up and operate machines to extrude thermoplastic materials to form tubes, rods, and film.

HAND FINISHERS use hand tools and sandpaper to trim and smooth molded, laminated, or machined items. Some Finishers might use machines.

ASSEMBLERS perform various tasks in the assembly of plastic articles such as fiberglass chairs, coolers, containers, and inflatable toys. They might also be called Fabricators.

INSPECTORS examine and test sheets, rods, tubes, or fabricated articles for color, surface defects, hardness, and dimensional accuracy using measuring instruments and test equipment.

MATERIAL MIXERS tend a machine that mixes resins, color pigments, and additives, for use in the fabrication of plastic packaging.

Other specialties include:

COMPRESSION-MOLDING-MACHINE OPERATORS
PLASTICS-MOLDING-MACHINE SETTERS
MIXING-MACHINE OPERATORS
PLASTICS FABRICATORS.

In addition to learning about these specialties, you may also find it helpful to explore the following MOIScripts:

ASSEMBLY LINE WORKER
MOLD MAKER/COREMAKER (METAL)
PUNCH-PRESS OPERATOR
MACHINE TOOL SETTER
CEMENT MANUFACTURING WORKER
FOUNDRY MOLD ASSEMBLY WORKER
CHEMICAL EQUIPMENT OPERATOR
BORING MACH/DRILL-PRESS OPER.
POLISHER & BUFFER
MANUFACTURING INSPECTOR
CUTTING MACHINE OPERATOR
PRESS MACHINE SETTER & OPER.
CALENDER OPERATOR

WORKING CONDITIONS AND REQUIREMENTS

In Plastic Products Plants or departments, the production or shop supervisor directs and coordinates the activities of Workers engaged in casting, molding, fabricating, and inspecting plastic products. Machine operators are usually responsible for training helpers.

Working conditions in plastic plants are good when compared with factory work in general. Plants are often modern, well lighted, and adequately ventilated. Molding departments may be noisy and warm.

Molding-machine operators often wear gloves, since they handle hot plastic pieces, and hand finishers wear steel mesh gloves when trimming products with a razor knife. In laminating departments, odors from laminating solutions may be disagreeable, and heat from presses may be uncomfortable. The accident rate in this occupation is about the same as that for all manufacturing.

The workweek for most Plastics Workers is 40 hours. They may work any one of three separate shifts. Some Workers may rotate from one shift to another.

Some overtime may be necessary from time to time to meet production deadlines. The average weekly number of overtime hours worked was 2.3 in late 1994.

Plastic Industry Workers may be unionized. Several unions which often present these workers are The United Rubber, Cork, Linoleum, and Plastic rkers; The International Association of Machinists and Aerospace Workers; nd The International Union, United Automobile, Aerospace and Agricultural Implement Workers of America. Plastics Industry Workers who belong to a union must pay dues.

You Should Prefer:

- Activities dealing with things and objects
- Activities involving machines, processes, or methods
- Activities of a routine, definite, organized nature

You Should Be Able To:

- Work easily and skillfully with your hands
- Do repetitive short-cycle tasks
- Work within precise limits or standards of accuracy
- Coordinate use of eyes/hands accurately to operate molding machines
- Rate information using standards that can be measured or checked
- See details in objects & recognize differences in shapes/shadings

Math Problem You Should Be Able to Solve:

How much plastic is present in a molded cylinder which is 2 foot high and has a radius of 5 centimeters?

ading Example You Should Be Able to Read and Comprehend:

May wind fiberglass, graphite or filament around parts, manually applying layers of resinous materials to part at specified intervals during winding process.

Writing Example You Should Be Able to Produce:

You should be able to write a report explaining any malfunction that may have occurred to the machinery.

Thinking Skill You Should Be Able to Demonstrate:

Should be able to assess the mixing process according to the formula given for that particular resin, catalyst, filler, accelerator or color.

Many employers require new employees to pass a physical examination as well as an aptitude test.

EDUCATION AND PREPARATION OPPORTUNITIES

NOTE: On-The-Job Training provided by the employer and a High School Diploma or Equivalent or a High School Diploma with specific Vocational ication Classes may qualify a person for this occupation.

The following education and preparation opportunities are helpful in preparing for occupations in the MOIScript:

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SCHOOL SUBJECTS

GENERAL MATH
INDUSTRIAL ARTS
SHOP MATH
CO-OP EDUC. TRADE & INDUSTRY
MACHINE SHOP
SHOP MECHANICS

VOCATIONAL EDUCATION PROGRAMS

MANUFACTURING TECHNOLOGY

Approved vocational education programs in Manufacturing Technology prepare students for one or more occupations in manufacturing. The cluster of courses provides for occupational competence which can be applied to many job titles in manufacturing.

Courses in other trade and industrial programs may be required for completion of this program.

High school students should consult their guidance office for more information about the specific requirements of this program at their school or area vocational education center.

POSTSECONDARY PROGRAMS

There are no Postsecondary Programs related to this MOIScript

APPRENTICESHIP OPPORTUNITIES

Although this occupation has apprenticeship programs available in Michigan, they are limited in number. See the Sources Of More Information below for name, address and phone number of the Bureau of Apprenticeship and Training.

You will also find a more extensive list of information sources in the "What Is An Apprenticeship?" document found under the MOIS Supports Menu Items.

MILITARY TRAINING PROGRAMS

There are no Military Programs related to this MOIScript

OPPORTUNITIES FOR EXPERIENCE AND METHODS OF ENTRY

High school field trips to plastic products manufacturing firms offer a chance to observe molding, extrusion, finishing, and other processes in this occupation. Secondary vocational education programs in manufacturing technology may offer a co-op portion which includes practical experience. School-to-Work opportunities include:

informal apprenticeships

mentorships

job shadowing experiences

touring a local Plastic Products Manufacturing Worker employer

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internships

volunteer work with a Plastic Products Manufacturing Worker employer

community service work with an agency

Although this occupation has apprenticeship programs available in Michigan, currently they are limited in number. Contact the Bureau of Apprenticeship and Training Representative in your area if you would like more information.

The most common method of entry is applying directly to employers. Jobs may be located by inquiring at school placement offices or local ranches of the Michigan Employment Security Commission. Newspaper want ads may list job openings.

EARNINGS AND ADVANCEMENT

Earnings of Plastic Products Manufacturing Workers vary according to the type of work done, geographic area, extent of unionization, and shift worked. Most Workers are paid by the hour. However, some molders and finishers are paid on a piecework basis.

Nationally, in late 1995, production workers in the plastics industry averaged about $10.44 per hour.

Many plastics industry Workers on afternoon and midnight shifts receive premium pay ranging from 5 to 25 cents more per hour. A few plastics processing firms also have profit-sharing plans for Workers.

Median hourly wage rates for Plastic Products Manufacturing Workers in 1995 were:

Job Title	Nationwide	Great Lakes States*
Injection-Molding-Machine Oper.	$ 7.49	$ 7.73
Compression-Molding-Machine Oper.	$ 9.35	$10.47
Extruder Operator	$10.74	$11.17
Reinforced Plastics Mach. Oper.	$10.21	$10.19
Finisher (General)	$ 8.87	$ 9.13
Buffer	$ ----	$ 8.28
Assembler	$ 8.61	$ 8.71
Inspector	$ 9.36	$ 9.12

*Michigan is included in the survey of the Great Lakes states.

Plastic Products Manufacturing Workers employed by automobile manufacturing companies as machine operators or finishers earned between $17.77 and $18.47 per hour in mid 1996. In addition, these workers receive a cost-of-living allowance.

Depending on the employer, most Plastics Products Manufacturing Workers receive paid vacations and holidays; life, accident, and disability insurance; sick pay; and retirement plans. These benefits are usually paid for, at least in part, by employers. Some employers also provide dental and

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optical benefits to their Workers.

Plastics Workers may have a career ladder that proceeds from Assembler or Finisher to Molding-Machine Operator, Machine Setter or Inspector, and to production supervisor or chief Inspector. Advancement depends on experience, training, and ability.

EMPLOYMENT AND OUTLOOK

There were 546,700 Plastic Products Manufacturing Workers employed in late 1994. Employment of these Workers is expected to grow more slowly than the average for all occupations through the year 2005. The manufacturing industry distribution for Plastic Molding Machine Operator and Tender looked like this:

SIC Code	Industry	% Employed
42308	Miscellaneous Plastics Products	76.2
41360	Electronic and Other Electrical Equipment	10.0
41371	Motor Vehicles and Equipment	3.9
42302	Rubber Products and Plastic Hose and Footwear	3.6
41394	Toys and Sporting Goods	2.7
41393	Manufactured Products, NEC	1.6
- -	Other	2.0

About 40,700 Rubber and Plastic Products Workers were employed in Michigan in 1994. The majority of these Workers worked in the area of plastics. They all worked in manufacturing. Most were employed by plastic products fabricators and firms making auto equipment and electrical machinery. These firms were located in most urban areas throughout Michigan, with the heaviest concentration in the Detroit, Grand Rapids, Kalamazoo, Flint, and Port Huron areas.

Employment of Plastic Products Manufacturing Workers in Michigan is expected to increase about as fast as the average for all occupations through the year 2005. Job openings will result from growth and the need to replace those who retire, die, or leave the labor force for other reasons. Additional openings will occur as workers transfer to other jobs or occupations.

Michigan's plastics industry grew substantially through the early 1990's. Growth is expected to continue.

The auto industry continues its use of plastics to reduce car weight and to cut costs. Opportunities in plastics manufacturing should be especially good for Molding-Machine Operators, Assemblers, and Inspectors. However, during poor economic times employment could be reduced.

MICHIGAN'S EMPLOYMENT OUTLOOK TO 2005

EMPLOYMENT AND OUTLOOK REGIONS	(1994) NUMBER EMPLOYED	PERCENT GROWTH	PROJECTED YEARLY JOB OPENINGS

State Total	40,700	***%	***

SOURCES OF ADDITIONAL INFORMATION

Printed Occupational information is available upon written request from sources marked with an asterisk (*) below.

United Steelworkers
of America
570 White Pond Drive
Akron, OH 44320
1-216-869-0320

*Plastics Education Foundation
C/O Society of Plastics Engineers
14 Fairfield Drive
P.O. Box 0403
Brookfield, CT 06804
1-203-775-0471

Society of the Plastics Industry
1275 K Street, N.W.
Washington, DC 20005
1-202-371-5200

Society of Plastics Engineers
P.O. Box 462
Birmingham, MI 48012

U.S. Department of Labor
Bureau of Apprenticeship
and Training
State Director's Office
801 S. Waverly Rd., Suite 304
Lansing, MI 48917
Phone (517) 377-1746

A Local Office of the
Michigan Employment
Security Commission

School Placement Offices

SUMMARY PROFILE

The occupation of Plastic Products Manufacturing Worker can be summarized by the following:

Growth Outlook:	As fast as average
Salary Potential:	Below average potential growth
GOE Cluster:	Industrial Interest Group (#06)
Work Values:	Work with machines or equipment, work with hands, auto mechanics
SDS Code:	Realistic (enjoys working with machines and objects)
Relationship to Data:	Compiling (observes operation of machine as work progresses)
Relationship to People:	Instructional (drives forklift to move products according to oral directions)
lationship to Things:	Operating-Controlling (moves levers to regulate the speed of the machinery)

MOIScript #216 Plastics Products Manufacturing Worker

Updated by Rick Zinser, Executive Director
Michigan Plastics Industry Roundtable
August, 1996

The nature of the plastics industry in Michigan has changed dramatically in the last 10 years. There are now almost 1400 companies employing about 160,000 skilled people. The industry has been growing at a rate of 20 percent per year and the future continues to look very bright. Plastics products, once characterized as "cheap toys and disposable food containers", now include high-tech high-quality products such as computers and other office equipment, cameras, appliances, and other consumer goods. About 40-60 percent of an automobile is now made of plastic which includes both interior and exterior parts.

Because it is still a relatively new and growing industry, many of the plastics companies are only 10 years old or less with brand new manufacturing facilities. The plants are super clean and air-conditioned, with state-of-the-art computerized equipment. The companies are also investing millions in employee training to improve their problem solving and technical skills. New occupational specialties have been added such as Process Technician, Quality Technician, and Team Leader. These are skilled positions paying in the $22-35K range.

Most companies are having trouble finding enough skilled workers so they are establishing school-to-work partnerships with high schools and community colleges to get more young people into the industry. Apprenticeships for plastics technicians are also being initiated by businesses which include work experience, in-house training programs, and company-paid college courses. Many community colleges and several universities have established certificate and degree programs for plastics in the last few years. Most importantly, their is enormous advancement potential for employees because companies are growing and generally promote from within.

MOIScript #216 - Plastics Products Manufacturing Worker

Related Occupations:

- 012 - Manufacturing Inspector
- 053 - Robot Technician
- 329 - Industrial Designer
- 015 - Mold Maker

Occupational Specialties should include:

Process Technician: samples new and revised molds to determine capability. Fine tunes the molding machine to establish the production process. Performs trouble shooting and problem solving in conjunction with engineers.

Mold Setter: sets molds in plastic injection molding, blow molding, or thermoforming machines. Connects utilities such as water lines, heaters, and hydraulics. Sets up secondary equipment such as worktables, material grinders, tools, fixtures, and packaging.

Quality Technician: monitors production process, collects data, and analyzes samples. Conducts tests and measurements using various equipment including a Coordinate Measuring Machine. Performs studies and experiments to solve quality problems.

Production Team Leader: Coordinates all aspects of production for a work group, department, or shift. Assists in hiring, training, scheduling work, assigning jobs, and evaluating performance. Held accountable for productivity and quality of operations.

Required Skills should include:

- Statistical Process Control
- Problem Solving Tools
- Teamwork and Communication

Education and Preparation should include:

- Statistics
- Business
- Manufacturing Organizations
- Plastics Internship

Postsecondary Programs should include:

Apprenticeships: company sponsored training including in-house and community college

Community Colleges: one year certificate or two year associates degree in Plastics Technology

Universities: Bachelor's degree in Plastics Engineering

Methods of Entry should include School-to-Work programs

Earnings and Advancement should include data for:

- Mold Setter

Process Technician
Team Leader
Quality Technician

Employment and Outlook needs to be updated:

"...expected to grow more slowly than the average for all occupations". This is not correct; plastics is growing at a rate of 20% per year and offers excellent career opportunities in many fields. Promotion is generally from within the company, and continuing education is often paid by the company.

"...about 40,700 workers were employed in Michigan in 1994". Not correct: current data shows that about 160,000 workers are employed and substantial numbers of positions are unfilled.

Sources of Additional Information should include:

American Plastics Council
332 Minnesota Street, Suite E-916
St. Paul, MN 55101
612-222-8628

Summary Profile should include:

Relationship to Data: Observes operation of machine and characteristics of product; Monitors, records, calculates, charts, and interprets data.

Relationship to People: Employees are cross-trained and work in small groups; they are often engaged in team problem solving, and demonstrate a strong customer / quality orientation.

The Solution:

Expose Students to World of Manufacturing

While there are multiple long-range solutions that involve high schools, community colleges and universities, the first step to solving the skill gap in the manufacturing sector includes insuring students are exposed to the exciting, demanding opportunities in the manufacturing sector. Businesses have a unique role to play by helping students understand the benefits of pursuing careers in this industry. The more students know about career opportunities, the better prepared they are to answer the question, "What is there for me to do?"

Proposal:

By September 1997, we will have available to 96% of the schools in Michigan a CD multimedia career development program for manufacturing. The CD presentation will include a virtual tour of a modern facility that will highlight occupations from the design phase through the final assembly. Specific features of this multimedia presentation would include:

Feature	Benefits
• Easy interface	Students navigate easily through text, computer-generated graphics and visuals, audio and video information.
• Manufacturing data base	Students interact with plant staff to learn about the industry and to take a virtual plant tour.
• Career data base	Students learn about different careers in automotive manufacturing (what it takes to get there, what to do when you're there, and where you can progress to).
• Skills data base	Students practice skills that are needed on the job and test their ability to think through a typical on-the-job problem.
• Technology data base	Students can "take apart technology," grasp the underlying principles, and "run machines vicariously."
• Labor market info data base	Students understand the reality of labor market growth in numbers versus percentages and industrial expansion.
• School subject data base	Students understand the necessity of taking certain school subjects and incorporating these classes into a plan.
• Training data base	Students learn where they can acquire the skills necessary to enter the manufacturing careers.

The Response:

Create a Multimedia Presentation That Will Increase Students Awareness of Careers in Manufacturing

We anticipate it will cost up to $300,000 to develop a comprehensive and dynamic multimedia presentation representative of the manufacturing industry. This would include support materials for parents, students, teachers, and counselors. The Michigan Jobs Commission will provide a challenge grant of $100,000 to be used to develop the structure for the multi-media presentation and the overview for each occupational cluster. The funds raised from the manufacturing parties will be used exclusively to develop materials for the manufacturing cluster.

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Michigan Center For Career And Technical Education

- Intranet
- Center Resources
- Gender Equity
- Professional Development
- School-to-Work
- Skill Standards
- Tech Prep
- Categories
- Search
- Comments

MCCTE is proud to announce its 19th year of service to Michigan Educators. Please feel free to visit us as often as you'd like - we'll always try to have something new for you to see!

Our Center offers many services and resources for Michigan Educators, including: Michigan School-to-Work Clearinghouse and School-to-Work Partnerships, technical assistance to Tech Prep consortia, Gender Equity projects, and Professional Development workshops offered by Michigan Department of Education staff.

New! Find resources and organizations by category from one easy-to-use page! Click on the **Categories** button from any of our section home pages to find resources in 15 different categories.

If you have questions about the Center, or any of the programs contact Gloria Kielbaso at kielbaso@msu.edu. For questions about the web site, contact Noel Estabrook

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Funded by:
Michigan Department of Education, Office of Career and Technical Education,
Michigan Jobs Commission in cooperation with
Michigan State University, College of Education

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Center Resources

MCCTE has numerous materials for professionals throughout the state. You can visit our library to look at over 6000 titles for loan in Michigan, or look at the current calendar of upcoming events and conferences . You can also access our Bulletin Board System directly from the Web! A complete list of our Internet-accessible resources are listed below:

- ☐ View the calendar of upcoming events and conferences
- ☐ See the Spring '96MCCTE Newsletter
- ☐ See the Fall '96 MCCTE Newsletter
- ☐ Visit our Library of materials for loan
- ☐ Find out a little bit about our BBS and then go directly to it!
- ☐ View our Sales Catalog. (Including information on how to order materials).
- ☐ Go to the Task List Index

MCCTE Home

Gender Equity

Professional Development

School-to-Work

Skill Standards

Tech Prep

Categories

Search

Comments

If you have questions about our Center Resources programs, contact Pat Brancel. For questions about the web site, contact Noel Estabrook

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Section IV

Promotion and Recruiting

A. Community Outreach

B. Planning a Program

C. Promotional Activities

D. Direct Recruiting

Section IV-A:
Community Outreach

- There are some good sources to help plastics companies get started in school-to-work. Starting with the big picture, the community, the strategy is to raise the awareness of the community about the benefits of the plastics industry. Companies may not realize that outside their own industry there are some myths and misconceptions about plastics that need to be addressed. This can generally be accomplished by direct contact and good information. SPI has a work book called Reaching Out: A Plastics Mobilization Reference Guide for this very purpose. There are eight groups to be reached: employees, schools, recyclers, government, community, media, industry, and retailers. SPI also has available 99 Ways to Get Involved in Your Local Community which is part of the Fax-on-Demand information system. See the outline included and call **1-800-774-4614**. Sample documents include Tips on Making Speeches and A Guide to Plant Tours.

- The Plastics Roundtable has conducted four Town Hall Meetings to promote its mission. The events were extensions of the Roundtable's monthly business meetings held in Grand Rapids, Port Huron, Novi, and Lansing. All of the local plastics companies and schools in the respective areas were invited to attend the general meeting on the plastics industry and breakout sessions on plastics school-to-work. Measures of success were the 80-100 participants at each meeting and the tremendous number of requests for membership information. The Roundtable is also co-sponsoring a state wide conference called the Michigan Plastics Summit. The event will showcase partnerships between industry, education, and government, and will feature keynote speakers, breakout sessions, and displays.

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A Plastics Industry Community Relations Resource

Introduction

Increasingly, members of the plastics industry are finding it necessary to reach out to a variety of audiences to promote understanding of our products, our production processes, and our contribution to the communities in which we work.

Total Quality and World Class improvement programs demand undertaking public education efforts as part of their evaluation criteria. In today's marketplace, in fact, competitive forces alone require that community leadership activities be undertaken to promote and grow a profitable plastics enterprise.

Reaching Out: A Plastics Mobilization Reference Guide was created to provide you with a handsome, sturdy, and handy way to organize the resource information necessary for taking a leadership position on industry issues in your communities. This binder system will help you bring together articles, brochures, handouts, and other resources that you collect for reference when designing your organization's outreach activities. To further assist you, the binder features a comprehensive catalogue of resources available for you, segmented by audience.

How It Works

Reaching Out: A Plastics Mobilization Reference Guide is organized into eight sections and an Introduction. Each section represents a major audience for your company to target:

- Your own employees;
- Community schools;
- Recyclers and state and local solid waste coordinators;
- Government officials;
- Community organizations;
- Local media;
- Industry to industry; and
- Consumer goods producers and retailers.

Each section tab is identified by an icon representing that audience. Each tab also presents an outline of the ways to reach that audience followed by a brief description on the back of the colored sheet. These outlined points suggest opportunities for communicating with that audience to promote our industry and its objectives.

This opportunity information is followed by the catalogue of resources available and appropriate for this audience. Each item listed includes: what type of resource it is (brochure, report, video, etc.); a brief description; the name of the organization from which it is available; and how to contact that organization. *Please note:* There could be a charge required to receive a listed item. Also, time is required for shipping, so if you wish copies of any selection—either an individual copy for reference or a stock of a particular item to hand out—order in advance. Neither organization is staffed to respond to last-minute rush requests.

Following the literature listings are "success stories" shared by companies that have used outreach activities with this audience. You should refer to these to help you develop approaches to reach your objectives. Each success story also includes the name of a contact person at the company. We encourage you to contact this person to discuss your plans and share ideas. We also encourage you to share your company's successes with our industry, following the same format.

At regular intervals, you will receive additional success stories to add to each section as well as updated literature listings. And of course, newsletters, handouts from presentations you have heard, notes from presentations you have made—all 8 1/2 x 11 inch material—should always be three-hole punched and inserted into the appropriate section.

Getting Started

Each section ends with a plastic sleeve for collecting offsize material—articles, brochures, notes—whatever you wish to save for potential use with that audience in the future. Your binder will probably arrive with these sleeves grouped together in the back. Take these sleeves and distribute them throughout the binder, one at the end of each section. Once you have done that, we suggest that you take a few minutes to pull out that file of random items you have been collecting and distribute them into the appropriate sections.

Based on this flexible, easy-to-use system, you are now ready to build your own customized Plastics Industry Community Relations Resource—organized, quick to access, ready to help you reach out and promote public understanding of the plastics industry and its contributions to our daily lives.

Reaching Out to Employees

Every day we are faced with opportunities to communicate with employees about company and industry-wide issues, advancements, and achievements. The plastics industry is a growing, vital industry, mobilizing the creativity, energy, and skills of hundreds of thousands of individuals to make products essential to contemporary life.

Our industry is a good place to grow a career, and a place where individual contribution is appreciated. Yet, ours is also a complex industry—an industry that frequently falls prey to criticism; an industry that is frequently a target of misinformation by competitors and special interest groups; an industry that must continually educate and reeducate the public on key facts, beginning with our own employees.

There are many ways to reach your employees. Posting news of industry developments on company bulletin boards is a good place to start. Key messages, such as news on recycling and technical achievements, should be posted to spread the word and build pride.

These key messages should also be repeated in newsletters, on payroll stuffers, and at employee meetings. It's important to look around you and identify the existing channels of employee communication within your organization, then make sure that they are used to promote the industry as well as communicate their traditional messages.

More formal employee education efforts include ordering and distributing selected industry resource materials to your employees. You may also rent or acquire videos available on key industry developments and provide time and facilities for your employees to view them. By organizing employee discussion groups following distribution of a piece of literature or presentation of a video, you can reinforce understanding of our industry's positions and make sure that the material was fully and factually understood.

As your employees gain growing awareness of the industry—its issues and its contributions—they become ready for active involvement in both internal and community improvement projects. Internal projects include forming waste reduction teams, preventive maintenance teams, and other teams that not only improve your business but build a responsible attitude toward monitoring the industry's impact in a number of areas. External projects such as adopt-a-highway or other public programs raise pride and demonstrate community responsibility.

We encourage you to read the case histories at the back of this section for some examples of activities you can undertake and results that can be achieved by investing time and resources in developing your employees' industry awareness while, at the same time, demonstrating strong community citizenship.

Reaching Out to Schools

Developing relationships with your local schools is a good way to broadcast a wider understanding of the plastics industry and good will for your company through an extended population. It also creates an opportunity to build a positive image of our industry and your company for many of these students—some of whom may become your future employees.

Schools have two distinctive audiences that you must recognize and prepare for accordingly: teachers and students. You can reach specific objectives by designing programs for one, the other, or for both together.

Of course, all outreach programs for schools begin by working with and through teachers. It's advisable, even before beginning to cultivate the teachers' involvement, to become acquainted with the top school administrator to find out what kinds of programs are favored by the school and what policies and procedures apply. Building a relationship between your business and your local school administrators is the best way to ensure that you will be included in any industry-involvement programs they offer.

There are two suggested approaches for working with teachers. One is to target teachers and focus on educating them so that they know the facts about plastics industry issues and achievements. You may want to take a group of teachers on a tour of your plant, explore opportunities for hiring them for the summer, for special projects, or even for consulting with you on the design of your outreach projects!

Another way to work with teachers is to find out what curriculum they are teaching, then supply them with materials—such as videos, industry literature, or charts and graphs—that will make their job easier when presenting the history and accomplishments of our industry. You may also want to take a lead role in making sure that these materials are known and available to local-area learning resource centers, teachers' professional organizations, and state teachers conventions and associations. When you identify an opportunity to distribute industry materials, you may call upon APC to help you select and place the appropriate items.

Working directly with students can take many forms. You may visit classrooms and work with teachers in presenting lessons on our industry—its science, contributions to society, and jobs. Or you may provide one or several employees to work with teachers in the classroom on a regular basis. You may make presentations to the school on industry days, participate in career nights, host field trips to your facility, offer student "shadow" programs, or sponsor summer jobs or internships. Students too, after exposure to our industry, may be eager to participate in your outreach programs.

When working with students, it's important to keep in mind the skills and expectations of your audience. Are they in elementary school? In middle school or high school? In college or technical college? Take care to plan your presentation and handout literature to meet the appropriate level. Again, APC can direct you to the resources designed for these specific audiences.

At the back of this section, be sure to review the success stories of other companies that have been involved in school programs. They provide valuable tips on ways to make the experience most meaningful for all participants.

Reaching Out to Recyclers and State and Local Solid Waste Coordinators

Working with recyclers and solid waste coordinators requires building relationships. It is important that you identify the key people, get to know them, and establish working relationships with them.

As a rule, you will find that they will appreciate your expertise and willingness to help them with their mission. You will find that you often have far more technical expertise in our industry than they do as well as more industry connections to get them answers to questions or access to resources.

In fact, in many communities—particularly with plastics recycling—recyclers rely heavily on plastics processors and producers:

- To provide public drop sites;
- Sometimes to help with initial transportation from your drop site to a central collection location; and
- To back haul plastic post-consumer and post-industrial waste from your larger customers to your own plant for reprocessing, or to a central location.

It's important that you and your employees become involved in your local recycling efforts. One way is to place your employees on local recycling advisory boards where their active interest and expertise will be of great value.

You will also want to make sure that your local recyclers and solid waste coordinators know of your company's environmental protection policies, recycling activities, and related successes. Seek out opportunities to make presentations to town meetings and other civic groups about your activities and the resources your company offers the community.

This is one area where it is imperative that you take a community leadership role. Our industry is your industry, and we all must be perceived not as the problem, but as the solution.

Please review the success stories at the back of this section for suggestions on ways to provide education and demonstrate leadership to this important audience.

Reaching Out to Government Officials

This audience is so important that each segment deserves a carefully planned, persistent campaign designed to help it understand the industry, your company's role in the industry, and the benefits your organization and its commerce bring the communities in which you work.

There are really three groups of public sector employees that operate in the development and conduct of policy related to our industry: city, state, and federal elected officials; economic development units; and local bureaucrats.

It is important to review the makeup of each of these audiences within your community to identify the individuals with responsibilities or interests that most closely touch upon or can most benefit the plastics industry and your company.

Then you will want to assess your resources and align them to build the network of relationships that will advance your outreach program. Invite key officials to your plant for tours. Remember: Seeing is believing.

Industry Mobilization staff is on hand to help you coordinate plant tours with elected officials. Regional Field Coordinators will provide you with support and help you achieve this goal. Please call 800-251-1778 to contact your Industry Mobilization Regional Coordinator.

In conjunction with tours or independently, organize and host breakfasts or luncheons with community officials, placing particular emphasis on those with environmental responsibilities. Keep them abreast of your company's—and our industry's—past accomplishments, present activities, and ongoing commitment to corporate responsibility.

There are many ways both you and your employees can participate in covering all the bases with this important audience. Get your employees on local environmental advisory boards. Both they and you should be assigned to attend relevant local council and committee meetings.

Throughout the process, both you and they should focus, not only on promoting your company's and our industry's successes, but also on collecting and reviewing what is going on in the various forums that make up this audience.

Concentrated, consistent involvement with government officials will keep your entire organization prepared to respond to action alerts on key legislation. Only by making our faces known and our voices heard can we make the point that we are important corporate citizens and a strong constituency.

We encourage you to read the success stories at the end of this section to learn of the strategies and tactics used by members of our industry to advance industry objectives.

Reaching Out to Community Organizations

Community organizations enlist and serve a wide range of audiences: specific age groups—older adults, younger adults, youth; groups with common special interests, such as science, nature, or charitable activities; and specific religions. Together, these community groups present a more relaxed, sociable environment in which to present our industry's messages.

Most community organizations are eager to have guest speakers at their events. Regardless of the common tie that binds them, most are also actively engaged in learning about the world around them and welcome insights into new fields.

Volunteer to make presentations before groups that might enjoy hearing about your company and our industry. You must take care, however, to tailor your approach to the audience level and special interests. It's important to spend some time with a representative of the group before making a presentation to be sure you know what those interests might be.

Your employees who share the special interests of these groups also represent an important resource for getting the word out. Support their involvement in these groups and provide them with the training and materials they need to inform their fellow members about our industry.

Again, plant tours are always a highly immediate, effective way to demonstrate the activities and policies of your company and our industry. Offer tours, particularly to youth groups and to older adults—those with more time to spend and who will enjoy seeing the technologies and processes you use.

The success stories at the back of this section cover some of the many community organizations that welcome industry education programs to learn more about the forces and issues at work in contemporary society.

Reaching Out to Local Media

Every community has local newspapers and other publications as well as radio and television stations that provide the news and influence opinion throughout an area.

Because these "voices" are so all-pervasive, it is important that you monitor them carefully and respond quickly with polite but commanding corrections to misinformation when it occurs.

To prevent unfavorable coverage of your company and our industry, you should begin—as a supportive reader/listener/viewer—by getting to know the editors and business writers, with special emphasis on those people covering industry and/or environmental "beats."

A good way to begin is by meeting them for breakfast or lunch for an informal discussion, during which you introduce your company and expertise as well as learn about their special interests and specific stories they are following or are in the process of developing.

Remember that these people are looking for "stories," and your ability to tell them stories about your company, its products, your employees, and our industry will help you win their attention. Offer yourself as a source to them for any stories that they might want to develop locally about plastics industry issues.

Once you get to know your editors/writers, maintain contact with them. A phone call now and then to touch base, offer an industry insight on an emerging issue, or suggest a newsworthy item—such as an opportunity to interview a highly ranked industry representative who might be visiting your company—is usually welcome. Always preface any call by acknowledging that media people are often "on deadline," asking if they have a moment or two to talk. If they can't, ask for a good time to call back.

Also feel free to correspond with them. Make it a habit to write editorial responses—favorable as well as critical—to stories that they do on industry-related issues. Do not be alarmed that not all are published. Consider it a way to engage in dialogue with them on what is most important to them—their stories and beats. Ongoing communication—not just when you want something—will position you to request, and get in print, those responses you want published.

Reinforce in their mind the professionalism of your company by issuing regular news releases on promotions of your employees, company accomplishments, and your community relations activities. Sharp-focus, black-and-white glossy photographs of the people involved are a big help towards getting your announcements published.

Advertise when you can and when it is appropriate. Show that you support your local media by buying its major business-to-business offering—ad space. At the end of this section, you will find an example of how a simple, cost-effective ad campaign in local sports and community-organization program booklets enhanced the positive community image of a company in our industry.

Remember, having a working knowledge and relationship with your local media positions you to turn to them for help and friendly reporting when your company and our industry need it most.

Reaching Out Industry to Industry

Our industry involves an extended network of resources that work together to produce and market plastic products—in all of their guises. This network includes raw material suppliers, processors, equipment suppliers, toolmakers, and more.

As a member of the industry, take a leadership role in that network. Nurture contacts with others in the network through correspondence and phone conversations.

Attend industry functions and volunteer to participate at industry events where our industry organizations establish a presence. Serve on committees and share your company's successes, challenges, and concerns with other members of our industry. Work on mobilization efforts with other members of the network to help present a committed, professional front to communities, legislative bodies, and other industries.

Offer your time and expertise to make presentations before other industries that use, engineer, or are in some way involved with plastics—and what industry isn't?

The plastics industry is a major economic force—a major player—and we must assume that role with gusto, pride, and sensitivity.

For example, preparing a presentation on the application by your company of a new material or process to develop a product for another industry can give you the opportunity to assume a role of leadership both within the plastics industry and before other industries. You might take that presentation before a technical session of our industry then, with alteration, also take the presentation before the industry of the end user.

Such commitment advances not only our industry awareness, but spreads news of our accomplishments throughout other industries.

Reaching Out to Consumer Goods Producers and Retailers: Suppliers and Customers

The audiences with whom you probably already have the best relationships are your customers and suppliers.

But don't take their knowledge of and support on industry issues for granted. There are probably many ways that you can leverage your regular contact with these two audiences to enlist their aid in advancing the outreach objectives of your company and the plastics industry.

Supply both groups with positive messages on plastics. Suggest selections of industry literature that they can read and share. Send them clips of articles and other printed pieces that promote our positions and responsible actions on a wide range of issues. And take time to discuss industry news on the technical developments and practical applications of plastics.

Also, share the resources that you use with your employees and other audiences—such as industry videos—with your suppliers and customers. Remember, they are part of the same network and face the same questions on plastics that you do. Help them to mobilize and add their voices and energy to the ongoing public education effort.

Further, consider initiating partnerships with customers and/or suppliers to help advance industry causes, such as recycling. For example, one processor of molded foam packaging has developed partnerships with many of its large customers. Working with one large personal computer manufacturer/customer, the processor developed literature that explains the protective benefits of foam packaging to the consumer and gives the consumer instructions on how to return the foam to the computer manufacturer for recycling. The computer manufacturer encloses this literature in each of its products with a shipping coupon, prepaid by the manufacturer, for returning the empty carton and foam. The processor then back hauls the post-consumer foam from the manufacturer when it delivers new parts and returns the used foam to the recycling stream.

We are all part of one economic chain, from the raw material producer to the end-user consumer. The more that we all know about plastics, the more we can appreciate the conveniences and value they bring to contemporary life. And the more we can all work with plastics in an informed, reasonable, and responsible way.

PLASTICS TODAY
CURRENT INFORMATION ABOUT THE PLASTICS INDUSTRY

99 WAYS TO GET INVOLVED IN YOUR LOCAL COMMUNITY... AND HELP YOUR BUSINESS

Searching for good ideas on how to get involved in your community? Check out the 99 we've listed here – many reflect the successes and experiences of other plastics companies. There's probably one that matches your interests, resources and the needs of your community. The numbers (in parentheses) after many of the ideas refer to other documents in this *Plastics Today* Fax-on-Demand information system, which will provide you with the information you need to turn a good idea into your own successful community involvement program - free.

While you may find that you're already doing some of these things, the supporting documents listed beside the activity may help increase the benefits your company gets from the time and resources you're already investing in your community.

To obtain the documents referred by the numbers in parentheses, call 1-800-774-4614 and enter the 4-digit number when asked for the "extension."

IN YOUR SCHOOLS...

☐ Conduct plant tours for students (2402, 2425, 2428, 2438)
☐ Conduct plant tours for teachers (2402)
☐ Make classroom presentations about the benefits of plastics (2301, 2303, 2401, 2409, 2434, 2438)
☐ Participate in school career days (2436)
☐ Get involved with Junior Achievement (2403, 2429)
☐ Provide teaching materials related to plastics (2301, 2430)
☐ Hire teachers for summer positions
☐ Hire students for after-school and summer jobs (2433)
☐ Develop a mentoring or shadowing program (2441)
☐ Donate equipment and books (2444)
☐ Give presentations and materials on careers in plastics to school guidance counselors (2401)
☐ Donate posters about the benefits of plastics (2451)
☐ Give presentations to parent/teacher (e.g. PTA) group (2401)
☐ Have a plant open house for parents to discuss careers in plastics (2401)
☐ Help develop school-to-work or internship programs (2433)
☐ Buy an ad in a yearbook or school newspaper
☐ Buy an ad in a sports program
☐ Start a scholarship fund
☐ Participate on school advisory boards (2439)
☐ Adopt a school
☐ Participate in science fairs
☐ Sponsor a science fair prize for most innovative use of plastics
☐ Sponsor an essay contest on the benefits of plastics
☐ Sponsor an academic or athletic achievement award
☐ Sponsor a youth leadership award
☐ Sponsor a science teacher of the year award
☐ Serve as guest lecturer at industry-related degree programs at local colleges (2436, 2441, 2401)
☐ Help develop a plastics technology program to prepare students for careers in plastics (2431, 2437, 2439)
☐ Work with a local college to develop an industry-related degree program (2436)
☐ Encourage employees to talk to students about their careers in plastics (2425, 2429)
☐ Find a sponsor for the "Plasti-Van" program

(continued)

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99 Ways to Get Involved ...

IN YOUR COMMUNITY...

COMMUNITY GROUPS

- ☐ Donate posters on the benefits of plastics to local grocery stores
- ☐ Participate on charity boards and committees
- ☐ Sponsor a youth sports team
- ☐ Coach a youth sports team (2429)
- ☐ Sponsor an adult sports team
- ☐ Attend town meetings regularly
- ☐ Sponsor a float in a local parade
- ☐ Invite civic leaders to a plant open house (2402)
- ☐ Give a presentation at a local senior center (2401)
- ☐ Get involved in the local Chamber of Commerce (2433)
- ☐ Participate in the Take Our Daughters to Work program and invite members of a local Girl Scout troop, YMCA, YWCA or Girls Club to your company for the day
- ☐ Support your employees' community activities on company time
- ☐ Understand community challenges and help find solutions (2445)
- ☐ Get involved in a local industry, commerce or technology museum (2122)
- ☐ Give presentations to Lions, Rotary and Kiwanis clubs (2401)
- ☐ Give presentations to local youth organizations (2401, 2432)
- ☐ Invite a local Boys Club or Girls Club to your company picnic
- ☐ Hold an annual open house/plant tour and picnic for the community (2402, 2432)
- ☐ Get involved with a local Habitat for Humanity project (2427)
- ☐ Get involved with a local economic development council (2436, 2437, 2440)
- ☐ Join other local plastics companies to sponsor booths at state and county fairs (2435)

GOVERNMENT

- ☐ Invite government officials (including the Mayor, city council and heads of city agencies) to tour your plant (2402, 2408, 2441)
- ☐ Invite government officials to information breakfasts or luncheons (2408, 2441)
- ☐ Write letters to government officials on behalf of plastics (2408)
- ☐ Testify before state legislative committees/panels to support/oppose legislation on behalf of plastics (2401, 2408)
- ☐ Brief local government officials on the economic contributions of plastics (2113, 2114, 2115, 2117, 2118, 2221-2250, 2408)
- ☐ Work with government officials to develop training programs for local workers (2437, 2440)

NEWS MEDIA

- ☐ Invite members of the local news media to tour your plant (2402)
- ☐ Provide local news media with information on company and industry developments and economic contributions (2221-2250, 2405, 2406, 2411)
- ☐ Get to know the editor of your local newspaper (2411)
- ☐ Offer to write a guest column in your local newspaper on industry developments or economic contributions (2411)
- ☐ Write letters to the editor in response to newspaper articles and editorials that may misrepresent plastics, your company or the industryor commend a well-written article (2411)

IN YOUR COMPANY...

EMPLOYEES

- ☐ Hang bulletin board posters on the benefits of plastics (2451)
- ☐ Include "payroll stuffers" with employees' paychecks (2450)
- ☐ Encourage and support employee involvement in the community
- ☐ Sponsor employee sports teams
- ☐ Discuss Community Involvement at staff meetings
- ☐ Post news of industry developments on employee bulletin boards
- ☐ Keep employees informed of your company's community involvement activities
- ☐ Publish stories in your company newsletter about employees involved in the community
- ☐ Recycle bottles and cans in the employee lunch room, and donate the proceeds to a local charity chosen by your employees
- ☐ Publish industry information and developments in your employee newsletter (2106-2112, 2407, 2452)
- ☐ Form an employee waste reduction team
- ☐ Organize an employee committee to determine

(continued)

99 Ways to Get Involved ...

community involvement activities

Industry Partners

- ☐ Share your company's and industry's successes and developments with suppliers, distributors and customers (2412)
- ☐ Join other plastics companies in developing employee training programs (2437)
- ☐ Encourage suppliers, distributors and customers to get involved in your community involvement programs (2437)
- ☐ Distribute posters on the benefits of plastics to suppliers, distributors and customers (2451)

FOR YOUR ENVIRONMENT...

- ☐ Participate in a (six pack) ring connector collection and recycling program (ITW)
- ☐ Promote Storm Drain Stenciling - Get the kit - Center for Marine Conservation, Wash. D.C.
- ☐ Help set up community recycling programs (2354, 2356, 2347, 2428)
- ☐ Help set up school recycling programs (2354, 2356, 2357, 2426, 2428)
- ☐ Educate students about recycling (2101, 2103, 2104, 2106-2112, 2120, 2353, 2357, 2428, 2430, 2438)
- ☐ Help set up recycling programs for local businesses (2354)
- ☐ Participate in an existing recycling program (2354, 2356, 2357, 2430)
- ☐ Provide a recycling drop-off center at your facility for residents and businesses that don't have access to recycling pickup (2352, 2432)
- ☐ Provide educational materials on recycling and plastics and the environment to the community (2106-2112, 2351-2357)
- ☐ Organize a park or beach clean-up
- ☐ Adopt a highway (2428)
- ☐ Get involved with Keep America Beautiful (2404)
- ☐ Participate in local Earth Day activities (2438)
- ☐ Support local environmental organizations
- ☐ Participate in your town's environmental advisory board
- ☐ Organize a school yard clean-up
- ☐ Donate recycling and environmental education materials to the local library (2101, 2103, 2104, 2120, 2351-2357)

Is your company doing something not on our list? Please share it with us and we'll add it to our list. Your idea could be the 100th! Do you have a success story of community involvement we could share with the industry?

*If you said YES to any of the above, **please fill out the form below and mail to Donna Dempsey at 1275 K St., N.W., Washington, D.C. 20005, or fax it to (202) 408-0736.** We will contact you for more details. As always, thanks for your interest and support...*

THIS COULD BE NUMBER 100...

TO: *Donna Dempsey, SPI*

FROM: ____________________

COMPANY: ____________________

____

PHONE: ____________________

FAX: ____________________

PROGRAM, IDEA OR COMMENTS:

____

____

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PLASTICS TODAY
CURRENT INFORMATION ABOUT THE PLASTICS INDUSTRY

TIPS ON MAKING SPEECHES

Making yourself available for speeches to local organizations and groups is a valuable way of gaining visibility for your business and your industry in your own community. It pays off in the long term by positioning your company as an important member of the community and as a good place to work.

For most of us, however, the thought of standing before a group of people and giving a speech is terrifying. It need not be — not if you heed the following guidelines and tips.

Advance Preparation

Know your audience — Determine in advance the size of the audience, who they are, their background and their knowledge of and opinions on the topic. Remember, in the back of their minds, the audience will be asking, "What's in it for me?" It's your task to answer that question.

Prepare your remarks — Clarify your goal: What are you trying to accomplish? Do you want people to better understand the plastics industry and your role in it? Will you ask them to take specific actions (e.g., start recycling programs that include plastics)? Select three main or "message" points you want your audience to remember. Tell the audience why the material you are presenting is important to them. Keep your remarks brief to leave time for questions. At the end of your presentation, summarize your main points and restate your messages. Tell the audience what you want them to do, and offer to help them do it.

Avoid technical language — Avoid confusing numbers and industry slang. Use terms the audience can understand. For example, instead of saying, "The plant can reclaim 27,000 tons of discarded plastic a year," say, "The plant can recycle enough discarded plastic to fill a two-acre square seven stories high each year."

Prepare audiovisual aids — Consider using slides, overheads and videos, as well as handing out information packets and copies or summaries of your remarks.

Practice, practice, practice — It is crucial to practice your presentation aloud. With enough practice, you'll be able to deliver your speech without reading it word for word, using your text or notes merely to jog your memory. People who read speeches tend to use a monotone and fail to maintain eye contact. As a result, they lose the audience's attention.

- If you use audiovisual materials, practice with them. Do not simply read the slides on the screen. Your audience will do that. Instead, talk about the points the slides make.
- Consider tape recording or videotaping your presentation to learn what improvements you can make.
- Nervous? While you won't get rid of the butterflies, you can get them to "fly in formation" if you know and rehearse your material.

Review questions and answers — Practice answers to questions — both easy and difficult —

(continued)

you are likely to get. Have someone practice with you, serving as the questioner.

Arrive early — Try out the microphone, lights and any audiovisual equipment. Many presentations are ruined when the light bulb in the projector dies, so be sure to have an extra one with you.

The Basics of Speechmaking

Let your enthusiasm show — If you care about your message, so will the audience.

Use vocal variety — The fastest way to lose your audience is to speak in a monotone. Vary your pitch and volume.

Use natural gestures — Avoid keeping your elbows glued to your side, leaning on the lectern or using the "fig leaf" position.

Maintain eye contact with the audience throughout the presentation. Select individuals and talk to them, if it makes you feel more comfortable, but switch the individuals to whom you are talking frequently.

Use a catchy title for your speech.

Start off with something that will grab everyone's attention — Be sure to memorize your opening.

Use pauses to emphasize important points — Pause after introducing a key idea or when making a transition to a new topic. Look at your audience while you pause.

Use visuals as an aid, not a crutch.

Leave the audience with a punchy ending — A dynamic quote can be an effective ending. Or, say something relating back to that catchy title.

Listen carefully to questions — Answer them in a way that emphasizes the message points you want the audience to remember.

Arranging Speaking Opportunities

Call a local group you'd like to address —

Consult your phone book or local library for the number. Note that most groups plan their meetings several months in advance and do not meet during the summer. If the group you want to address is booked, offer to serve as a backup speaker in case someone cancels.

Tell the program coordinator what topic you would like to talk about and how it will relate to the group's members.

Send the program coordinator a written introduction of yourself, plus a speech title that will attract interest.

Ask the program coordinator whether someone from the local media will be invited to cover the meeting — If a reporter attends, make yourself available to him or her before or after the meeting to answer individual questions and offer additional materials.

Leave the audience with a handout on your company letterhead — It might take the form of your full remarks or a one-page summary or your presentation. Be sure to include your phone number so attendees can call you with follow-up questions or invite you to speak at other organizations to which they might belong.

For questions or assistance in locating related material, please call 202/371-5218.

Revised: 7/96

PLASTICS TODAY
CURRENT INFORMATION ABOUT THE PLASTICS INDUSTRY

A GUIDE TO PLANT TOURS

Inviting the public to tour your facility is an excellent way to demonstrate your company's commitment to the community, including your company's contribution to the local economy, the jobs it provides and, where appropriate, its environmental efforts and successes.

A plant tour allows the public to gain an understanding of the company's importance to the community, and to see first-hand how your company works and how current issues relate to your facility. It is much easier for people to understand the complexities of making plastic bottles out of recycled materials by seeing it happen, rather than by reading about it.

Whether you invite legislators, students, employees' families, the news media or others, each group will have slightly different interests in touring your facility. However, the key messages that you want all groups to carry away are:

- Your company plays an essential economic role in the community (and, in the case of larger companies, in the country);
- The safety, health and medical benefits attributable to plastics' durability, shatter-resistance and other performance characteristics enhance the quality of our lives; and
- Your company and your industry are responding to consumer concerns about the role of plastics in the environment.

Goal

In planning each tour, consider your goal. In some cases, you simply will be building goodwill. In other instances, you may want to ask individuals or organizations to take a specific action, such as writing their legislators. In the case of visits by legislators or other government officials, you may want to persuade them to consider a specific position on proposed legislation.

In all instances, you will want to discuss current issues affecting your company and to demonstrate the responsible actions your company is taking.

Audiences

A number of groups will have an interest in touring your plant, including:

- Legislators and local government officials
- Business organizations, including chambers of commerce
- News media
- Students and educators
- Professional organizations — plastics and others
- Employees' families
- Customers, suppliers and distributors

Preparations

Planning a plant tour is not difficult; it just takes careful attention to detail before, during and after the tour.

Select a committee to coordinate the program. The committee should be representative of your organization, and could include the employee relations manager, newsletter editor, government relations manager, employees, and personnel manager. Input from each of these individuals and groups will ensure a well-rounded program, enabling you to anticipate the questions and concerns of your visitors.

(continued)

A GUIDE TO PLANT TOURS

Issuing invitations. In all instances, issue the invitations in writing. In the case of legislators, deliver the invitation in person. Other suggestions:

- Use your company letterhead.
- Make your letter direct and short.
- Suggest several dates that will work for your organization, and issue the invitation as much in advance as possible.
- For schools, include information on the recommended ages for children, with regard to safety and interest levels.
- Arrange for photographs. If your plant policy restricts outside photographers, mention that fact in advance, but offer to take any pictures they request. Photos can be used in internal newsletters, industry publications, and by the organization that tours the facility.
- Once an invitation has been accepted, telephone the contact's office to confirm logistics, including time, date, number of guests, and length of the tour. Mention whether or not media are expected to attend. Find out whether any guests have special restrictions, such as not being able to use stairs. In the case of school tours, indicate appropriate attire, if necessary.

Announce the tour to employees. Once the logistics have been confirmed, notify employees about the plant tour. Use your newsletter, have supervisors announce the tour, and distribute a memo. This is especially important when legislators or other government officials will be touring the facility. You may want to invite employees to make suggestions for the tour to help build their enthusiasm.

Other preparations. Make sure key machinery and equipment are functioning properly so that your visitors can see them in operation.

Prepare your remarks in advance. (See below for details.)

Select the tour guide carefully. It is important that the guide be articulate, knowledge about plant operations and the company's issues, and that he/she know by name any employees the visitors are likely to meet during the tour. Select one or more key hourly employees to be part of the tour and assist in planning and preparations.

Plant tours for the news media. Consider inviting the news media to attend a tour you are giving a local group, or giving them a tour of their own.

To invite the news media to attend a group tour:

- Send a written invitation to your local paper's metropolitan or business report, and follow up with a phone call.
- Invite the reporter to bring along a photographer. In some instances, the reporter may not be able to attend but may simply send the photographer.
- If a reporter cannot attend, offer to send a news release and, if possible, a photo from the tour. Prepare the release in advance, add a quote by a guest right after the tour, and send it immediately (the same day) to the reporter.

To give a plant tour for the news media:

- Contact newspapers and broadcasting stations in your area to determine the appropriate person at each outlet. Explain to them why a tour of your plant is important to their understanding of the industry and the issues facing it.
- Arrange a briefing by your company's managers as part of the tour. Give background on the company and on the plastics industry. Be as forthright as possible with the facts about your firm — products, sales, revenues, ownership, etc.
- Give the media group a comprehensive tour of the plant. Show off any new or unique products or processes.

The Tour Itself

Mapping out the tour. The first task is to make your guests feel welcome. The key to making the tour go smoothly is the advance planning you have completed.

- Begin the tour in a meeting room. Explain what the visitors can expect to see.

(continued)

A GUIDE TO PLANT TOURS

- Wait for all members of the group to arrive before starting the remarks.
- Use a microphone if the group is large, so everyone can hear.
- Keep your remarks brief but interesting. Include anecdotes about the facility and employees to add a personal touch, and use appropriate humor.
- Call attention to specific machinery and displays that the visitors can see.

Scripting the tour remarks. Regardless of your audience, you will want to include some or all of the following information in your remarks:

- Products manufactured and their end use
- Number of people employed.
- Dollars paid in federal, state and local taxes, and property taxes. If you can, correlate that information to something of relevance to the group. For instance, for a school group, make the connection between your local tax contribution and the school budget.
- Dollars spent locally to buy supplies, materials and services, and other companies in the area that buy from or sell to your company.
- The safety, health and medical benefits attributable to plastics' durability, shatter-resistance and other performance characteristics.
- Efforts on the part of your company and the plastics industry to respond to consumers' concerns about the environment. (Various materials detailing the industry's efforts are available through "Plastics Today" fax-on-demand resource center. Check the menu of available materials, extension 2000.) Many of these items are also available as pamphlets or brochures which you can obtain ahead of time for distribution to the group.
- Environmental programs, new equipment and their costs.
- Safety and health standards in the plant — protective equipment, facilities and technology
- Use made of profits — including site improvements and research.π
- Philanthropic activities by your company, especially those on the local level.

End the tour as you began it, in a meeting room. That will provide the opportunity to answer final questions from your visitors and to hand out any additional materials or product samples. Bear in mind that plant noise sometimes interferes with people's ability to hear all of your script during the tour. Offer to repeat any explanations they may have missed due to the noise.

After the Tour

Immediately following the tour, you may want to send a news release to any local media that did not attend, along with photos if they are available right away. The media are most likely to use the information if a lawmaker is involved. To assure timeliness, the release should be in the hands of the media the same day as the tour and should include relevant quotes from a tour participant or two.

Include an article about the tour in your next employee newsletter, mentioning the names of all employees who participated and assisted in planning.

Also, send information on the tour to the SPI's Community Involvement program through the "Plastics Today" resource center (see fax cover sheet for details) so we can share with other members the success of your experience and demonstrate the benefits of conducting such tours.

Write thank-you letters to the group that visited your facility. The letter is an opportunity to reinforce major points, to remind them of any actions they agreed to take, and to mention your availability for return visits or questions. Include copies of any photographs of the tour.

For further information or assistance in locating related materials, please call 202/371-5218.

Section IV-B:
Planning a Program:

- One of the first steps may be to contact the local **Workforce Development Board** which has authority over school-to-work funds. The state wide directory is included in Section 2C or simply call 1-800-285-WORK. The Boards meet monthly and would be open to including a plastics school-to-work proposal on their agenda. The majority of the membership and the chairperson of the Board are from the private sector. Other members include representatives from public schools, public postsecondary education, MESC, labor, community based organizations, rehabilitation, economic development, and public assistance. The private sector representatives are nominated by the Chamber of Commerce and are appointed annually by locally elected officials. See the matrix of Roles and Responsibilities.

- Other **key players** are the local school superintendent, the school district school-to-work expert, the vocational-technical center, and the community college. A presentation at a school board meeting by a consortium of local plastics companies could be effective for promotion and recruiting. If the school district already has school-to-work programs in place find out how to get on one of the Business Advisory Committees. See the example from Kalamazoo County and the Tech Prep Advisory Committee from MTAG.

- Jobs for the Future has published a guide called Steps to Creating a School-to-Work Program which may be a helpful overview for those new to the topic. They also have a School-to-Work Toolkit which has chapters on planning and launching a program. Included here are strategies for recruiting employers, teachers, school administrators, parents, and students.

No Wrong Door System

MICHIGAN JOBS TEAM

Roles and Responsibilities

	Chamber of Commerce	Local Elected Officials	Workforce Development Board
Role in Appointment Process of Workforce Development Board Members	Provides nominations to Local Elected Officals for the private sector representatives which equal 150% of the vacancies to be filled.	Recommends to the Governor the appointments to be made from the nominations received.	Works with the Chamber and LEO(s) to undertake the nomination and appointment process for vacancies on the WDB. The process for filing vacancies is the same as for original appointments.
Fiscal Oversight and Liability	No role.	Assumes liability for the proper expenditure of funds and repayment of any disallowed costs. Designates a grant recipient to be the fiscal fiduciary.	In partnership with LEO(s), provides oversight regarding the proper expenditure of funds. Makes decisions regarding funding awards for the delivery of services and administration of the programs.
Relationship of Partners	Provides nominations to LEOs for original private sector representative appointments to the WDB and for future vacancies. Assists LEOs and WDB in efforts to maintain a high level of private sector involvement at the local level.	Is a partner with WDB in the local planning and operation of the workforce development system.	Works with local Chambers to maintain private sector involvement. WDB and LEOs in partnership develop the plans for the operation of the workforce development system.
Responsibility for Program Operation (JTPA, Work First, School-to-Work)	No formal responsibility, advisory to the LEOs and WDB regarding the needs of employers to ensure system is responsive. Assist with employer involvement in the STW initiative.	Maintains fiscal liability for the expenditure of funds.	Responsible for the ongoing management and operation of programs and funds which are under the direct control of the WDB.
Development of Comprehensive Workforce Development Plan	Provide input regarding employer and workforce needs in the region.	Jointly with the WDB approve the plan to be submitted.	Develop the plan to be submitted.

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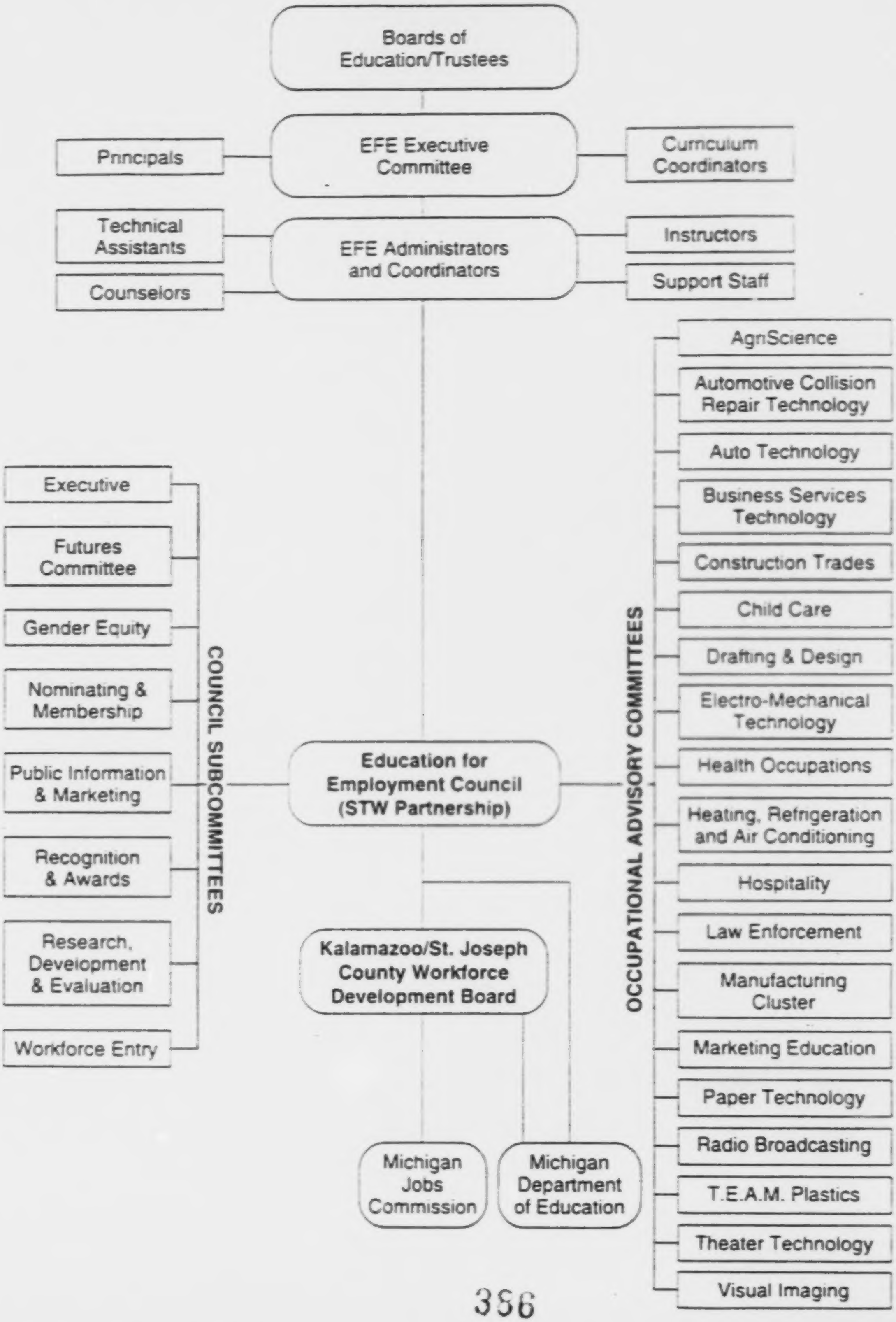
Kalamazoo County Education for Employment

SYSTEM


Boards of Education/Trustees
EFE Executive Committee
Principals
Curriculum Coordinators
EFE Administrators and Coordinators
Technical Assistants
Counselors
Instructors
Support Staff
Education for Employment Council (STW Partnership)
COUNCIL SUBCOMMITTEES
Executive
Futures Committee
Gender Equity
Nominating & Membership
Public Information & Marketing
Recognition & Awards
Research, Development & Evaluation
Workforce Entry
OCCUPATIONAL ADVISORY COMMITTEES
AgriScience
Automotive Collision Repair Technology
Auto Technology
Business Services Technology
Construction Trades
Child Care
Drafting & Design
Electro-Mechanical Technology
Health Occupations
Heating, Refrigeration and Air Conditioning
Hospitality
Law Enforcement
Manufacturing Cluster
Marketing Education
Paper Technology
Radio Broadcasting
T.E.A.M. Plastics
Theater Technology
Visual Imaging
Kalamazoo/St. Joseph County Workforce Development Board
Michigan Jobs Commission
Michigan Department of Education

Recruiting Employers

School-to-work programs ask employers to play a significant role in designing and providing work and learning opportunities for students. This is a departure from most school-business partnerships, which typically are more limited in scope and employer commitment. To recruit employers, program designers must understand what might motivate employers to play this more significant role and make it as easy as possible for them to get involved.

Basic strategies for recruiting employers include:

- **Using business leaders to recruit their peers**—Peers have the best chance of convincing employers of the value of participation. CEOs and other top managers can gain access to and command the respect of the leaders of other firms, with whom they share common concerns and expectations.

- **Anticipating and being prepared to answer employer concerns**—Employers want to hear clear, concise answers to their questions and concerns about program administration, design, costs and benefits. Employers who have had mixed results with previous school-business partnerships will particularly want to know how the school-to-work program can be structured for success.

- **Highlighting specific benefits to employers**—The message crafted for employers should underscore the short- and long-term benefits of participation. Two areas of emphasis are broad labor market trends—aging of the existing workforce, rapid technological change, the demand for new skills, the high costs of recruitment, the decline of traditional training pipelines—and the individual firm's civic profile.

- **Building a genuine partnership**—Involve employers early in the program planning so that they have significant responsibility and sense of ownership. Employers will have a greater interest in becoming involved and maintaining their support if they feel that it is *their* program, too.

- **Clarifying the expected roles and responsibilities of employers**—School-to-work programs require employers to commit time, staff and money. It is essential to make clear from the beginning appropriate roles and responsibilities that are consistent with program goals and basic design. Employers will be more willing to become involved if they know up-front what is being expected of them. *(see Employer Roles and Responsibilities card)*

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Recruiting Teachers and Guidance Counselors

Teachers and counselors generally play a dual role in school-to-work programs—they help design the program and then implement it at the high school. Designing and implementing school-to-work programs require fundamental changes in standard practices. Teachers collaborate with employers to develop integrated curricula, team-teach with their peers, and "coach" rather than lecture to students. Guidance counselors connect students to the local labor market and a range of postsecondary options, not only four-year colleges. Without strong teacher and counselor support it is impossible to realize these necessary changes to the traditional operation of schools.

To foster interest in the school-to-work program:

- **Bring teachers and counselors into the design process**—Unless they have an opportunity to influence the design process, it is unlikely that they will take program implementation seriously.

- **Link program goals to concerns that teachers and counselors have identified**—Make it clear that the goals of the program are consistent with concerns raised by staff about student performance, efficient operation of the school, professional development and support, and preparing students for the world at large.

- **Educate teachers and counselors about the changing demands of the workplace and the range of postsecondary options**—Help them better understand the academic, social, and technical demands of modern work and the range of career and learning opportunities in the community by providing opportunities to visit the workplace and meet with worksite staff. *(see Staff Exchange card)*

- **Provide staff support**—Ways to support staff involvement include: arranging visits to other school-to-work programs to learn first-hand how project-based learning and team-teaching approaches are put in place; supporting attendance at school-to-work conferences; providing time for teachers and counselors to meet with peers on issues of curriculum and program development; and supplying concrete examples of integrating school-based and work-based learning. *(see Orientation and Development of School Staff card)*

- **Enlist current participants from other programs**—Teachers and counselors often become more interested when they hear the enthusiasm of their peers and their students.

Recruiting School Administrators and District Support

Administrative support at the school and district levels is critical. On-going administrative support is needed to: permit innovative scheduling of students' and teachers' time *(see Creative Scheduling card)*; obtain waivers of standard sequences of course instruction; and access district resources to support program development and operation. When recruiting support, connect your program to the goals of education partners and:

- **Sell the concept of school-to-work**—Provide administrators and school boards with concrete information on the implementation process and success stories of other school-to-work programs. Provide solid data (e.g., drop-out and postsecondary completion rates) to clarify the need for the program.
- **Heed administrators' concerns about program design**—Administrators' educational goals should weigh equally with those of employers in developing the school-to-work partnership. Administrators will feel a need to assure that students retain a college attendance option, to respond to students' and parents' concerns, and to incorporate sufficient supports to overcome barriers to student achievement. *(see Ongoing Support for Students and Career Counseling cards)*
- **Help secure teacher and guidance counselor buy-in**—Even enthusiastic administrators will fail to establish successful programs if teaching and guidance staff are unconvinced of the validity of school-to-work pedagogy. *(see Recruiting Teachers and Guidance Counselors card)*
- **Obtain outside start-up funding**—Programs that bring in state, federal or private foundation funding may be more quickly seen as contributing to the district than those that the district has to underwrite from the outset. It is much easier to secure support for new innovations that have funding attached.
- **Develop a long-term plan**—Long-term funding for the program after the start-up stage helps ensure that it is not seen as an "extraneous reform effort."
- **Build, and draw upon, community support**—Expressions of interest and support from parents, teachers' unions, influential employers, postsecondary institutions, community organizations, local school committees and local government officials will carry weight with building and district administrators and school boards.

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Working with Parents

Parents can be either enthusiastic supporters or suspicious opponents of school-to-work programs. A program without parental involvement may not be focused on student needs: program planners should heed parents' concerns.

Strategies for working successfully with parents include:

- **Ask parents their concerns, and respond to them**—Be ready to respond to typical concerns of parents, such as: Is the program another form of tracking? Will college options still be open to my child? Will my child be forced into making a career choice too early? What sort of job will he or she be doing? Will transportation be made available between the school and the workplace?

- **Involve parents in program design and ongoing operations**—Parent-teacher organizations can be a good venue for recruitment and orientation.

- **Invite parents to visit the people and institutions connected with the program**—Making it possible for parents to visit the firm(s) and school(s) where their children will be learning can help them better understand the nature of the program. Providing opportunities for them to meet the supervisors and teachers on an informal basis gives parents the chance to discuss their concerns and interests in the program with the people who will be working with their children.

- **Have parents sign a mutual expectations agreement**—Being party to an agreement with employers, teachers and their child can enlist parents in reinforcing their child's learning.

- **Stress the guidance and career planning components of school-to-work when marketing to parents**—Students often complain that "no one at school cares." Stressing to parents that special supports will be provided to help students negotiate the demands of school-to-work and make decisions about future education and career goals will help demonstrate to parents that your program is not "business as usual." *(see Ongoing Support for Students card)*

- **Begin your program early**—Parents are usually enthusiastic about career awareness and job-shadowing opportunities at the elementary or junior high school levels. Starting all children in career-focused programs early can lessen the chance that the school-to-work program will be labeled by parents as "second-best."

- **Work with community-based organizations**—Community-based organizations are often a voice and advocate for parents. Working with these organizations can be a vehicle for parent communication.

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Recruiting Students

The best incentive for student participation is a program that is considered by peers and parents as high status, with a range of postsecondary options including college, work and technical training. Program staff should provide students, and the adults who influence them, with clear and compelling information about program design and benefits, emphasizing that the program: is a stepping stone toward further high value work and postsecondary educational opportunities; doesn't cut off options, but enhances them; and provides supports to students.

To recruit students:

- **Distribute student information packages**, including program brochures, course listings, newspaper articles, information on local industry trends and brief quotes from program participants.
- **Hold student assemblies** with employers and have participating students provide testimonials.
- **Host open houses** for students, parents, and staff at employer facilities.
- **Involve students in the recruitment process** after the first year of implementation, since students can be a program's best advocates.
- **Win the support of guidance counselors, student services, career guidance centers and parents,** because they will help determine students' schedules and guide their academic choices .
- **Provide opportunities for work-based learning that incorporate paid work** and allow students to earn while they learn. Your program will be competing with the reality that students often need to make money.
- **Determine and publicize eligibility criteria** to give students a clear idea of what they need to do to participate.
- **Present at middle school** civics and career development classes to promote the program.
- **Personally recruit prospective students and parents** through letters and meetings.
- **Conduct community outreach** using newspapers, radio, television and presentations at parent/community-based organization meetings.

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Serve on Tech Prep Advisory Committees

Purpose

Serving on Tech Prep advisory committees allows manufacturers to provide direct input into program development, outcomes, and management. This participation can involve various positions, levels of participation, or commitment. Input from industry is vital to maintaining the effectiveness of the Tech Prep program. Students, the educational community and regional businesses all stand to benefit from this involvement.

Process

- Contact the Tech Prep consortium in your area.
- Discuss with the consortium director your willingness to get involved. The director can advise you regarding where your participation will be most appropriate and effective.
- Ask the consortium director to brief you on current projects. This will help you integrate into existing project teams.
- Select the project or process to which you wish to commit.
- Attend planning, process, and project meetings.
- Provide industry expertise as appropriate, including input on subject matter and management.
- Share Tech Prep information in staff meetings, departmental briefings, with colleagues, and others.
- Promote Tech Prep at community organization meetings such as Rotary, Kiwanis, and chamber of commerce.
- Act as an interface between industry initiatives and the associated educational requirements.
- Recruit other business representatives to get involved.

Payoff

- Advisory role ensures curriculum aligns well with industry needs.
- The company participates in the development and delivery of technical programs.
- The educational community gains greater awareness of industry needs.
- Employees provide benefits for students, the educational community and regional employers.
- Technical expertise is shared with future workers.

Pitfalls

- Time demands on committee members may be significant.
- A supervisor or manager who does not support the Tech Prep concept can create a barrier to participation. Make sure to get key people on board.
- Be careful not to over commit yourself. Be clear about how much you are willing to do.
- Clarify your role. Are you representing your company, your community, your children? All three?

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Costs

- Work and/or personal time
- Travel costs to and from meetings

Section IV-C:
Promotional Activities:

- One of the most successful promotions by the Plastics Roundtable has been the "career ladder" or Plastics Industry Career Opportunities. People outside the industry may not be informed about the growth of plastics, the changing technology, and the opportunities for advancement. The career ladder therefore has been useful for building the awareness of teachers, parents, and students. It dispels the myth that employment at a plastics company is "just a six dollar an hour factory job".

- SPI has a series of pamphlets and posters that are appropriate for grades 11-14 students with the theme of Plastics: They Make a Difference. Each pamphlet is aimed at different sectors such as construction, health care, and transportation. See the accompanying list of SPI brochures specifically for teachers. SPE has a brochure on professional careers for college students and a video called "Not Your Average Field Trip" for high school students. Contact their Education Department. The American Plastics Council has numerous brochures, especially on Resource Management.

- The National Plastics Center and Museum has a traveling Plastivan which visits schools all over the country. Review the attached brochure and call **508-537-9529** or visit their web site at **http://www.polymers.com/npcm**. The schedule for the 96-97 school year is already established and one stop will be the Michigan Plastics Summit on April 10.

PLASTICS INDUSTRY

	Production	**Skilled Trades**	**Engineering**
$70K – $100K 4-6 years college or equivalent 20 – 35 years experience	Vice President Director Plant Manager		Vice President Director
$50K – $75K 4-6 years college or equivalent 10 – 25 years experience	Director Operations Mgr.	Tooling Mgr. Maintenance Mgr.	Program Mgr. Tooling Mgr.
$40K – $55K 4 years college or equivalent 10 – 15 years experience	Dept. Manager Superintendent	Machine Builder Toolmaker II Facility Eng.	Dept. Supervisor Design Eng. Tooling Eng.
$25K – $40K 1 – 4 years college 8 – 12 years experience	Shift Supervisor Group Leader Sample Tech.	Toolmaker I Millwright Electrician	Project Eng. Designer Process Eng.
$21K – $32K 1 – 2 years college 3 – 5 years experience	Process Tech. Mold Setter Utility Worker	Drafter Machinist II	Estimator Drafter
$16K – $21K 1 year college 3 – 5 years experience	Utility Worker Skilled Operator Secondary Oper.	Machinist I Apprentice II	Clerical Intern
$12K – $16K high school grad 0 – 3 years experience	Machine Operator Assembly Oper.	Apprentice I	

This document was developed for the discussion and career awareness of young people to show the approximat levels of experience, education, and compensation in various functions. It is not meant to be a salary survey of th industry.

The career levels and organizational functions in this matrix represent "typical" plastics companies in the 100-50 employee range.

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CAREER OPPORTUNITIES

Quality Assurance	Materials/ Purchasing	Finance	Sales/ Marketing	Human Resources
		Vice President Director	Vice President Director	
Director Manager	Director Manager	Director Manager	Director Sales/Mktg. Mgr. Sales Eng.	Director Plant H.R. Manager
Quality Eng.	Traffic Mgr. Purchasing Mgr. Prod'n Control	Accounting Mgr. Data Proc. Mgr. Programmer/Analyst	Sales Professional	Training and Safety Manager Benefits Manager
Quality Eng. Senior Tech. Supervisor	Senior Buyer Scheduler	Payroll Supervisor AP/AR Supervisor Computer Operator	Sales Person Coordinators	Supervisors Professionals
CMM Operator Laboratory Tech. Layout Tech.	Buyer Scheduler Shipping Svsr.	Specialists Financial Analyst Accountant	Customer Service Market Analyst	Specialists Administrators
Clerical Auditor/Inspector	Ship./Rec. Clerk Material Handler Inventory Clerk	Accountant Data Entry Clerical	Clerical	Clerical
	Material Handler			Receptionist

Experience and education alone do not guarantee success. Progress on any career track is dependent on many factors such as attendance, performance, innovation, and management ability, and of course the opportunity for advancement.

Developed by Rick Zinser for the Michigan Plastics Industry Roundtable, August 1996. Call (616) 327-5849 for more information.

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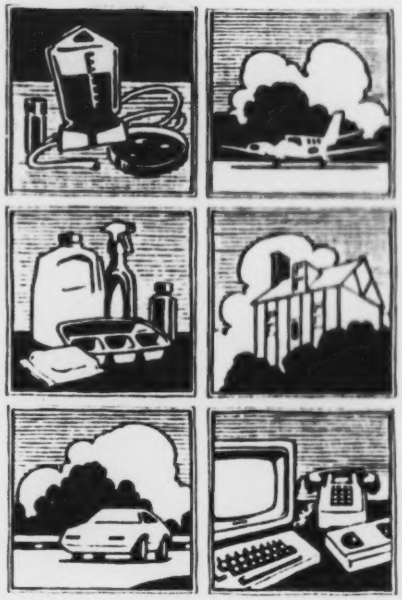
PLASTICS



MATERIALS
OF PROGRESS
AND PROMISE.

SPI

■

THE PAST FIVE DECADES HAVE BEEN TIMES OF AMAZING PROGRESS.

TASKS THAT ONCE TOOK HOURS NOW TAKE MINUTES. LIFE-SAVING PROCEDURES ONCE UNDREAMED OF NOW ARE COMMONPLACE. WE CAN COMMUNICATE WITH EACH OTHER INSTANTLY—*FROM* ALMOST ANYWHERE *TO* ALMOST ANYWHERE. PEOPLE OF VISION HAVE CREATED MACHINES THAT "THINK." WE TRAVEL THE WORLD WITH EASE. AND MEN HAVE WALKED ON THE MOON.

TO A GREAT EXTENT, THIS ASTOUNDING PROGRESS HAS BEEN PROPELLED BY EQUALLY ASTOUNDING MATERIALS: PLASTICS.

TEACHERS

BROCHURES

Plastics in Perspective

A 21-page booklet answering the most frequently asked questions about plastics in the environment.

Source: APC 1-800-2-HELP-90

Plastics: At Your Service, Every Day, in Every Way

Beautifully-illustrated, 16-page, four-color brochure that your company can use with employees and others to help tell the important story of plastics. Includes a color flowchart on "How Plastics Are Made".

Source: SPI (202) 371-5257
Credit card orders only: 1-800-541-0736
Indicate #AB-103

The Plastics and the Environment Sourcebook

A compendium of information on curriculum materials and plastics industry contact for plastics issues and plastics recycling. A second section suggests classroom activities to teach all ages of children about plastics and packaging in general.

Source: PSPC/SPI (202) 822-6424

Plastic Benefits Brochures **(Plastics in Aerospace; Plastics in Building and Construction; Plastics in Packaging; Plastics in Health Care: Plastics in Transportation; Plastics in Electronics; Plastics: Materials of Progress (Overview))**

Set of information pamphlets that explain the ways in which plastics contribute to our lives every day. Share this important story with your customers, your employees and your community.

Source: SPI (202) 371-5257
Credit card orders only: 1-800-541-0736
Indicate #AB-111

Introduction to Composites (College Level)

A 108-page reference handbook of the composites industry, covering resins, reinforcement, fillers and additives, and processes used in manufacturing.

Source: SPI (202) 371-5257
Credit card orders only: 1-800-541-0736
Indicate #AF-168

Opportunities in Plastics Careers (High School/College)

Thousands of workers earn a living designing, manufacturing, buying and selling products made of plastics. This authoritative industry overview examines opportunities in both high-level technical and scientific positions and lower-level manufacturing and assembly line jobs. Specifies education and training, current salaries and outlook for engineers, researchers, mold and die workers and others involved in plastics and similar petroleum products. Written by Jan Bone and published by VGM Career Horizons. 160 pages.

Source: SPI (202) 371-5257
Credit card orders only: 1-800-541-0736
Indicate #AB-130

Shop Recycled!

The booklet helps consumers identify products made with recycled plastic content or packaged in recycled-content plastic. Single copies free. Additional copies are $5. This booklet is meant for consumers. Not technical! Examples...teachers, recyclers, community organizations, city solid waste manager.

Source: APC 1-800-2-HELP-90

Stretch Wrap Recycling: A How-To Guide

Takes consumers step-by-step through design and implementation of a stretch wrap recycling program.

Source: APC-1-800-2-HELP-90

KITS

Plastics in Our World

Classroom activities for grades K-3, 4-6, or 7-12 created by APC with help from science teachers and a curriculum-development specialist. Kit includes: "How to Set up a School Recycling Program"; "Plastics in Perspective"; "Five Major Myths About Garbage & Why They're Wrong"; "Plastics Packaging: Opportunities & Challenges"; and order forms for "The Resource Revolution" and "Working Together for a Healthier Planet" videotapes.

Source: APC 1-800-2-HELP-90

"Not Your Average Field Trip"/"Solving Tomorrow: Scientific Investigations and Career Opportunities in Plastics Technology"

A teaching package including "Not Your Average Field Trip" video which contains several brief educational segments that will both interest and involve your students.

Source: Video Outreach
(516) 436-7490

VIDEOS

"Working Together for a Healthier Planet"

A 15-minute video exploring waste management options and examining ways to preserve our environment.

Source: APC 1-800-2-HELP-90

"Not Your Average Field Trip"

A 19-minute video which demonstrates the extraordinarily versatile and significant applications of both the material and the technology.

Source: Video Outreach
(516) 436-7490

"Convenience Recycled"

A 13-minute video which shows how schoolchildren and others ar starting polystyrene recycling programs nationwide. Shows the recycling process and interviews business people who make new products from recycled polystyrene.

Source: PSPC/SPI (202) 822-6424

Now the Programs so successful at the Center and Museum in Massachusetts are available across the United States and Canada.

Can't come to us? Now we can come to you! The **PlastiVan** of the National Plastics Center and Museum can now come to a school, science center, town hall, or industrial site near you.

PlastiVan Programs:

- **Plastics Science Lab** – an hour-long hands on experience in plastics science and chemistry for up to 30 of your students, grades 3 - 8. Students do fun and educational experiments in plastics science that also address environmental issues. They make **Slime™**, learn about the **Chemistry of a Diaper**, learn how strong plastic grocery bags really are and why...and much, much more.
- **High School Groups** – option of one and one half hour laboratory experience with additional experiments, with discussion of chemical formulas and reactions, and how plastics are created, each with unique properties. More advanced treatment of environmental issues is also included.
- **Miracle Materials** – an exciting, fast paced hour-long assembly program for audiences of up to 300. Suitable for middle and high school students, adult groups such as PTOs, community groups, and meetings of professional societies. Guaranteed to inform, amuse, and contribute to environmental awareness.
- **Teacher Workshops** [illegible]o to four hour workshops available for up to 30 teachers in middle and high school. Teachers learn all of the experiments and demonstrations and are provided with kits of information, sources of supplies, and many materials to take home.

Facilities Required:

- One 8 foot table and one 120v. grounded outlet for all presentations.
- Tables or benches for students in Lab programs.
- Overhead projector for High School program.
- Water and a sink in the room are desirable but not absolutely necessary.
- All of the above for Teacher Workshops.
- If at all possible, all programs in a single day should take place in the same room. This is especially important if time between presentations is limited.
- Lavalier or wireless microphone required for Miracle Materials presentation for audiences over 100.

Fees:

- $1,000 per day for up to five labs, three assembly programs, or some combination thereof.
- $500 per day if within one day's driving distance (round trip) of Leominster, Massachusetts.
- Call the Center and Museum for information on fees for Teacher Workshops. Fees depend on enrollment and length of session.
- Sponsorship through local profess[illegible]al societies and businesses is often possible. If you are seeking sponsors, call the Center and Museum. We may be able to direct you to sources in your area.
- **If you are interested in sponsoring a PlastiVan Visit in your area, send for our brochure "Tips on Sponsoring an NPCM PlastiVan Visit in your Area."**

Book Early!

For further information and a schedule of when the PlastiVan will be in your area, please call (508) 537-9529 or check out our Home Page on the Web at http://www.polymers.com/npcm/

The area schedule for the PlastiVan for the coming school year is usually available in early August.

Goop
PLASTIVAN!

Cady Goldfield

The National Plastics Center and Museum
210 Lancaster St., P.O. Box 639, Leominster, MA 01453
Tel: (508) 537-9529. FAX: (508) 537-3220
Email: vwilcox@polymers.com

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Tips on Sponsoring an NPCM PlastiVan Visit in your Area

A Check List for Industrial and Professional Society Sponsors

——— Appoint a "point person" to handle all logistical details in the area.

——— Contact the National Plastics Center and Museum about the availablity of the PlastiVan in your area. Or consult the schedule on our Web Page at http://www.polymers.com/npcm/ The travel schedule for the school year is generally available in early August.

——— If funding a visit to your area is an issue, explore the possibility of co-sponsorship with other businesses or professional/trade association groups.

——— Contact someone in the school system you want to serve. Often, the office of the Science Supervisor is an appropriate place to start. Or you may know an enthusiastic, interested teacher or principal who would be willing to help. Emphasize that WE come to THEM - no busses, permission slips, etc. Try to give schools as much choice of dates and as much advance notice as possible. Schedules can often be hectic for them.

______ Decide, with the school system, science center, or whatever, which programs are most appropriate for your (and your audience's) needs – Miracle Materials, Plastic Science Labs (what level), Teacher Workshops, etc. Please refer to Van Brochure for descriptions of these programs.

——— If possible, try to book an entire week in the same or neighboring school areas. Our schedules can get hectic, too!

——— Consider the possibility of featuring Miracle Materials in an evening meeting for added impact. Groups that may be interested include PTO's, Senior Citizen groups, civic, religious or fraternal groups especially interested in science or education.

——— Would the families of your employees be interested in an evening or Saturday presentation – either Miracle Materials or hands-on labs for the kids

——— If there is a local Science Center, they might also be interested, either "in house" or as a part of their already established outreach programs. Contact their Executive Director or the Director of Education. For example, we spent a January, 1996, working out of the Arizona Science Center in Phoenix.

———Would you be willing to offer plant tours to students as part of a total package? If so, work out a schedule convenient for you and the school.

_____ When the program is finalized, alert local media representatives (newspapers, radio and television stations) about the forthcoming programs. We have general information already prepared that can be of special assistance to you.

——— Obtain names, addresses, telephone and FAX numbers, contact persons, and schedules of presentations in each school. Our road crew always talks directly with these contact persons a few weeks in advance of the visit.

——— Furnish us directions and maps for each site, plus suggestions for suitable accommodations for our crew in each area.

——— Ask if anyone on your staff or in your professional society would be interested in learning any of the programs to present locally at a later date. Suggest that they attend at least two presentations, and talk with our instructors. Lists of sources of materials are available; training materials are being developed.

NATIONAL PLASTICS CENTER & MUSEUM

- About the Center & Museum
- School Visits Program
- Become a Member
- The John Wesley Hyatt Society
- Exhibits Under Development
- NPCM Jobs Listing
- The Director's HotLinks!
- Newsletters and Brochures

National Plastics Center & Museum

E-Mail the Executive Director: Valerie A. Wilcox
210 Lancaster Street • Route 117 • PO Box 639
Leominster, Massachusetts, USA
Tel. (508) 537-9529
Fax. (508) 537-3220

Section IV-D:
Direct Recruiting

- Several of the plastics school-to-work programs featured in Section 3 have done direct recruiting in the classrooms at high schools. The first step is to contact the guidance office and perhaps do a brief presentation for them. Then the counselors could survey teachers they think would be interested, say tenth grade math and science teachers. Then the plastics company representative would visit the class to make a 45 minute presentation with plastics parts, the career ladder, and the field trip video. If possible refer to former students who have graduated from the plastics school-to-work program. It is recommended that these visits take place in the early spring when counselors are working with students on their schedules for the next school year.

- The Western Michigan Section of SPE offered several one day seminars for teachers and counselors to learn about the plastics industry. These were well attended and completely successful with regard to increasing teachers' awareness about the skills required and the opportunities available in plastics. See the attached Announcement From SPE.
- Similarly, Grand Rapids Community College has held several week long Teacher Academies during the summer to introduce teachers and counselors to the technical and interpersonal skills required in today's high skill jobs. This has been very successful for promotion and recruitment, and has enormous potential to influence curriculum design.

- One of the most direct ways to reach teachers, and therefore students, is employing **teachers as summer interns** at plastics companies. The teachers see and learn firsthand some of the academic skills being used in plastics manufacturing. This experience gives them a new grounding in the importance of applied math and science, communication, and team problem solving skills. See Offer Teacher Internship Programs from MTAG.

- The **Job Fair** is a strategy used for recruiting students for employment who are getting ready to graduate. This can be adapted and used for recruiting tenth grade students for the school-to-work program. The event is typically attended by 4-8 plastics companies who bring displays and literature to the school. Students have the opportunity to spend about 10 minutes with each company; they can leave a résumé with the employer and take a job application. Employers can make on the spot appointments for interviews. See the attached announcement for the Plastics Job Fair from a high school in Indiana.

Western Michigan SPE Educational Foundation
2111 Northridge Drive N.E., Grand Rapids, MI 49505

"To foster and support
plastics education
in Western Michigan."

August 17, 1996

Officers

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Grand Rapids, MI 49501
ph# 616.791.0611

We are aware that as an administrator/counselor you are concerned about your students being prepared for meaningful employment as an adult.

The purpose of the Western Michigan SPE Educational Foundation is to help educators learn about the enormous number of opportunities available in the fast growing plastics industry. These opportunities are not only in the Western Michigan area, but nationally and internationally.

We believe that many students and educators are not aware of the variety of opportunities for both degreed and non-degreed persons who have interest in applying science and technology to the products of our future.

We are offering a Free one day seminar available on two different days, October 18 and October 25, designed specifically for administrators and counselors. We hope this seminar will help bridge the gap between education and the plastics industry.

The seminar will present information relative to the job market that exists in the plastics industry, types of employment, degrees of education required for various levels, and current wages for those levels. The seminar will provide facts that will demonstrate the opportunities in this industry. Information will be provided relative to the preparation of high school students for a career or additional education in plastics. In addition, the seminar will be attended by knowledgeable persons from the plastics industry to answer your questions not addressed during the seminar.

Please take just one day out of your busy schedule to attend this **free** seminar which we feel will help you help your students make important decisions about their future. The seminar will run from 9:00 am to 4:00 pm at Grand Rapids Community College in Grand Rapids. A complementory lunch will be provided at noon.

We understand the financial constraints that schools are functioning under, which is our primary reason for offering this seminar **ABSOLUTELY FREE**.

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If you would like to learn more about the opportunities the plastics industry has to offer, please fill out the enclosed reservation slip and return on or before September 20. Include any of your colleagues you feel would benefit from this seminar.

Confirmations will be sent to you including a map to the Grand Rapids Community College and directions for parking.

In the event of any date changes due to the number of reservations we receive, you will be notified immediately.

If you can not attend after having made reservations, please contact Marc Vander Kooi, at (616) 245-6008 or (616) 957-0520. No shows are costly for us.

Board of Directors
Western Michigan SPE Educational Foundation

Please send reservations to:

Marc Vander Kooi
ADAC Plastics, Inc.
3175 Union Avenue, S.E.
Grand Rapids, MI 49588-8375

------------------------------ cut here ------------------------------

Please make reservations for ______ persons for the Seminar specifically designed for administrators and counselors

on October 18 ______ , October 25 ______ , or Either date is fine ______

Name, address, and phone number of each attendee.

____

____

____

____

____

____

THE THEORY BEHIND THE TEACHER ACADEMY

It has been said that people in education are out of touch with the needs of businesses; therefore, students are not prepared for employment in the "real world."

The Teacher Academy provides you with the opportunity to experience the technology and critical thinking skills required by today's employers. You will gain the know-how needed to develop course materials that focus on jobs and occupations. As a result, your students will gain a better understanding of today's workforce requirements.

With first hand exposure to new technology, management philosophies and business processes, you will begin to significantly influence the modification of your existing lesson plans and career counseling to reflect the changing world class business and industry standards.

In addition, by actively participating in the Teacher Academy, local employers play a key role in changing existing educational models to better prepare tomorrow's workers.

> *" Top-drawer, a great value for the money. "*
>
> – 95 participant

WHO SHOULD ATTEND?

The Teacher Academy was developed for elementary, middle and high school teachers, counselors and administrators who are interested in getting firsthand knowledge of the technical and interpersonal skills required in today's workplace. These skills can then be integrated into curriculum at all levels.

COURSE DESCRIPTION

This is a hands-on, highly interactive 5-day course combining activities in the ATC industrial and computer labs with an in-depth on-site experience in a west Michigan business.

COST

$400 – non-credit
$450 – with CEU's
$590 – for 2 Ferris State University graduate credits (EDU 694)

MORE INFORMATION–

Call Paul Prins, Tom Boozer or Vicki Janowiak, at the Applied Technology Center– 616-771-3600.

APPLIED TECHNOLOGY CENTER
Grand Rapids Community College
Ferris State University

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COURSE CONTENT

PARTICIPANTS WILL:

- Learn how quality practices used in the workplace can be used in the classroom.
- Participate in team problem solving processes and learn how teams are used to improve productivity in the workplace.
- Observe the high wage, high responsibility, high demand job options available to today's workers.
- Learn the academic, technical, and interpersonal requirements for world class employment.
- Experience hands-on applications in Computer Aided Design (CAD). Computer Numerical Control machining (CNC), Plastic Injection Molding, and Programmable Logic Controllers (PLC's).
- Search for and locate information on the Internet.
- Be able to discuss work and education options with students and parents.
- Learn about health careers.
- Use real world examples in the classroom that are based on personal experience.
- Learn the most critical attributes required for today's workers in the global marketplace.
- Experience instructional technologies.
- Interact with other educators who want to do a better job of preparing students for work.
- Hear from last year's Teacher Academy participants on their progress.

> *" First Class all the way! "*
>
> –'95 participant

SCHEDULE

SESSION 1 **JUNE 17-21**
SESSION 2 **JULY 22-26**
SESSION 3 **AUGUST 12-16**

Three classes are currently scheduled. Each meets for one week, Monday through Friday from 8:30 a.m. to 4:30 p.m. **Lunch is included and provides great networking opportunities.** Classes meet each day at the Applied Technology Center. Personal transportation will be required to travel to company worksites.

MON	TUE	WED	THU	FRI	
WELCOME via Distance Learning lab Team Training Problem Solving Measurements & Standards • ISO/QS 9000 • Performance Documentation	Overview: Information Technology • Internet • Multimedia • Distance Learning	Overview: Manufacturing • CAD • Manual Machining • CNC/CAM • Plastics	Overview: Health & Service Industries	Curriculum Design	AM
Company Contacts	Company Visits	Company Visits	Company Visits	Panel Discussion Program Evaluation	PM

Please note: Schedule subject to change

Offer Teacher Internship Programs

Purpose

Teacher internships provide educators with direct experience with how technical and academic skills are applied in a modern workplace. For many educators, this is their first opportunity to view a modern manufacturing workplace. The result is valuable insight into the skills and academic requirements needed by students when they transition to work. In addition, teachers can update technical skills for use in the classroom, and manufacturers can help shape curriculum design and delivery. If the participating company is also sponsoring a student intern program, coordinating both within the same school will maximize return.

Process

- Develop program proposal including:
  1. Objectives, budget, timelines and project plan.
  2. Determine if interns will be paid and if so, how much.
  3. Coordinate with contracting agency, such as a consortium, if appropriate
  4. Obtain appropriate approvals.
- Develop internship program description including:
  selection criteria, potential intern project descriptions, application and selection process.
- Advertise the program and potential projects through participating consortia.
- Conduct informational meeting for interested teachers. Distribute applications.
- After consortia prescreens:
  review applications based on selection criteria, select interns, and notify all applicants.
- If using a contract agency, coordinate all required paperwork.
- Recruit company personnel to act as mentors/sponsors for teacher interns.
- Conduct orientation meeting to discuss schedules, expectations, projects and available resources.
- Introduce interns to mentors. Encourage mentors to maintain contact with the incoming intern prior to the start of the program.
- Mentor and intern develop project schedule/plan and secure necessary approval, resources, and access prior to the start of the program.
- Finalize administrative requirements (contracts, access clearance, work schedule, etc.)
- Schedule joint activities such as tours or classes.
- Host internship kick-off meeting with all interns and mentors. Include tour or classes scheduled.
- Conduct interim reviews of progress and barriers. Adjust as necessary.
- Provide regular meeting times for interns/mentors to discuss experiences and share successes.
- Have interns present project overviews at a recognition event for interns, mentors, school and consortia personnel.
- Provide feedback mechanism for all participants.
- Coordinate continuing education credits or clock hours awarded.
- Conduct a follow-up study several months into the school year to determine effectiveness of internships in terms of classroom applications.
- Hold quarterly reunions of the interns to share best practices and develop a network. Invite interns to present their experiences at regional conferences.

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(Teacher Internships cont.)

Payoff

- Internships give valuable "world of work" experience to the teachers of tomorrow's workforce.
- Provides school-based advocates for other Tech Prep activities and builds rapport between mentors and interns.
- Allows educators to validate technical competencies and curriculum content
- Gives educators foundation to re-evaluate and adjust course content and competencies.
- Provides for direct influence on how technical skills are taught and learned.
- Helps the company understand the world of education. Helps educators understand the company. Increased communication and understanding furthers additional integration of academic and technical learning.
- Educators who are attuned to the needs of the business community will better prepare students to enter the world of work.
- Business and educational relationships can be used to identify prospective candidates for special projects and programs such as student internships, industry task teams, competency validations, career speakers, and other collaborative efforts.

Pitfalls

- Poorly defined intern projects can result in activities that provide little or no return for the company or the intern.
- Ensure that expectations of teacher interns are crystal clear.
- Make sure all projects focus on curriculum development, process familiarization, or other techniques such as Total Quality Management.
- Avoid general overview projects. These may find little transfer to the classroom.
- Seek an even balance between academic and vocational teacher interns.
- Teams of interns, academic and vocational, will provide a broader curricular focus. Work to ensure team members are compatible.
- Ensure that mentors are accessible during the period of the internship.
- Mentors should be selected based upon interest rather than assignment.

Costs

- Coordination and management time.
- Intern salaries
- Transportation costs associated with travel between meetings, tours, etc.
- Meeting facilities and refreshments for periodic meetings.
- Follow up study and evaluation.

Thank you for your interest in bringing students to the Plastics Job Fair in our Media Center this Friday, April 12.

Please inform students that the job fair has a dual focus:
(1) information about a major industry in our area
(2) potential summer jobs / future career orientation.

Approximately 8 companies will be set up to meet with students (most will be represented by owners, CEO, manager, etc.) Students will spend about 5 or 6 minutes with each company and then will move to another. Companies will have sign up sheets like the one I have attached here for students who are sincerely interested in a summer job to sign. Students who sign will be expected to come back to the company's table during the first part of lunch on April 12(same day as job fair) to fill out a job application. (The day before the job fair would be a good time to tell students about the above process for job seekers).

PLEASE BRING YOUR CLASS TO THE MEDIA CENTER ASAP AFTER THE TARDY BELL RINGS. Your supervision of students during their period in the library will be essential to the success of the job fair.

Thank you again for your interest. If you have questions please let me know.

Carolyn Mayes

Section V
Integrated Curriculum

A. Manufacturing Skills

B. Plastics Skills

C. Employability Skills

Integrated Curriculum

Section V-A: Manufacturing Skills

- The National Association of Manufacturers has produced an interactive CD-ROM course to introduce high school students to manufacturing careers called Make It! America. Students can "tour" three different plants, investigate a host of manufacturing careers such as production engineering, and participate in team problem solving simulations. The course could be used by high schools for general career exploration or as an introduction for a manufacturing school-to-work class.

- The Manufacturing Curriculum developed by the MTAG group in Washington State, referred to in Section 1E of this Guide, is a good example of 10 categories of manufacturing topics to be covered in grades 11-14.

- The Ford Motor Company developed a manufacturing school-to-work curriculum in 1990 called FAMS: Ford Academy of Manufacturing Sciences. This program is now being used in 65 high schools throughout the country, including the Kalamazoo TEAM Plastics High School referred to in Section 3C. FAMS has recently introduced additional courses for ninth and tenth graders called Workplace Communications and Information Systems. Call **1-800-799-FAMS** for information.

- Job Skill Technology, a for-profit company that works with industry-education partnerships, is another source for manufacturing curriculum. Included here are descriptions of three interactive CD-ROM courses: **Statistical Process Control, Safety**, and **ISO 9000 Registration**.

- Safety training is essential for young people going into industry. In addition to the commercial resources available, the Safety Education and Training Division (SET) of the Michigan Department of Labor has several pamphlets and videos suitable for high school students. See for example Youth Workplace Health & Safety. SET consultants will also make presentations in the classroom. See the certificate from Kalamazoo Valley Health/ Safety Partners.

FORD ACADEMY OF MANUFACTURING SCIENCES

Workplace Communications

Course Outline

- *Unit One: Introduction to Manufacturing*
- *Unit Two: Careers in Manufacturing*
- *Unit Three: Personal Management Skills*
- *Unit Four: Team Skills*
- *Unit Five: Reading in Manufacturing*
- *Unit Six: Writing in Manufacturing*

Course Description

Workplace Communications introduces students to the wide range of careers available in the manufacturing industry and the communication and personal management skills required to succeed in the world of work. Through a series of individual tasks, team activities, and in-basket exercises, students learn the importance of time management, goal setting, and personal responsibility. They also have an opportunity to apply their reading and writing skills in a business/manufacturing context.

Course Outcomes

- Define manufacturing terminology.
- Utilize time management techniques.
- Describe several possible careers in manufacturing.
- Develop job campaign strategies: planning careers, marketing individual skills, and interviewing.
- Demonstrate the ability to communicate appropriately in the workplace.
- Work as a team member to solve manufacturing problems.
- Read and process technical information quickly and effectively.
- Write and organize business documents (letters, memos, tables, and graphs) to meet the needs of a specific audience.

Recommended teacher: Business and/or English

FORD ACADEMY OF MANUFACTURING SCIENCES
Workplace Communications Course Outline

- ***Unit One: Introduction to Manufacturing***
  - Manufacturing: What is it?
  - Manufacturing Terminology
  - Time: A Critical Resource

- ***Unit Two: Careers in Manufacturing***
  - Major Functions in Manufacturing
  - Manufacturing Careers
  - Case Studies: Examples from Industry
  - Career Forecasting
  - Planning Your Career
  - Marketing Yourself
  - Interviewing Skills

- ***Unit Three: Personal Management Skills***
  - Communication: How it Works
  - Sending the Message
  - Listening
  - Feedback
  - Telephone Techniques
  - Time Management

- ***Unit Four: Team Skills***
  - Teamwork — What are the Benefits?
  - Problem Solving Strategies
  - Decisions, Decisions. . .
  - Your Role as a Team Member
  - Team Planning Strategies
  - Meeting Techniques

- ***Unit Five: Reading in Manufacturing***
  - Increasing Your Understanding
  - Increasing Your Efficiency
  - Reading Technical Materials
  - Graphic Information
  - In-Basket Exercise

- ***Unit Six: Writing in Manufacturing***
  - Identifying Your Audience
  - Organizing Information
  - Format: The Final Touch
  - Letters and Memos
  - Tables, Graphs, and Diagrams
  - In-Basket Exercise

FORD ACADEMY OF MANUFACTURING SCIENCES
Manufacturing Organizations

Course Outline

- *Unit One*: ***History of Manufacturing***
- *Unit Two*: ***Economics in Manufacturing***
- *Unit Three*: ***Public Policy and Manufacturing***
- *Unit Four*: ***Manufacturing Systems***
- *Unit Five*: ***Manufacturing Processes***
- *Unit Six*: ***Measuring Quality***

Course Description

Manufacturing Organizations is designed to provide students with a semester-long overview of the world of manufacturing. The course highlights the history of U.S. manufacturing as well as the major economic and public policy factors which affect the industry. In a variety of individual and team activities, students learn about the functions of a manufacturing organization, the processes used to manufacture a product, and how measurement and evaluation is used to ensure a quality product.

Course Outcomes

- Describe manufacturing as an industry.
- Identify changes in the world of manufacturing.
- Identify people in history who helped to shape the world of manufacturing today.
- Use economic indicators and models to monitor the performance of a business.
- Identify state and federal legislation that affects manufacturing.
- Use a master production schedule to monitor and improve production.
- Use measurement and evaluation to improve a manufacturing process.

Recommended teacher: Business or Social Studies

FAMS
FORD ACADEMY OF MANUFACTURING SCIENCES

FORD ACADEMY OF MANUFACTURING SCIENCES
Manufacturing Organizations Course Outline

- ***Unit One: History of Manufacturing***
  - Now and Then: What are the Changes?
  - A Look at the Past
  - Who's Who in Manufacturing?

- ***Unit Two: Economics in Manufacturing***
  - Introduction to Economics
  - Economic Systems
  - The Market Environment
  - U.S. Economic Indicators
  - The Production Possibilities Frontier
  - Supply and Demand
  - The History/Economics Connection

- ***Unit Three: Public Policy and Manufacturing***
  - U.S./State Roles in Manufacturing
  - U.S./State Laws that Affect Manufacturing
  - Labor Unions in Manufacturing
  - International Agreements that Affect Manufacturing
  - Politics and Manufacturing

- ***Unit Four: Manufacturing Systems***
  - Organizational Systems
  - Organizational Structures: How the Work Gets Done
  - Manufacturing Functions: How are They Related?
  - Manufacturing Functions: What Do They Do?
  - Isolation vs. Integration

- ***Unit Five: Manufacturing Processes***
  - Planning for Production
  - Production Processes
  - Designing the Process
  - Changing the Process
  - Measuring the Process

- ***Unit Six: Measuring Quality***
  - Why Evaluation is Needed
  - Evaluation Can Be a Challenge
  - Meeting the Standards
  - Nothing is Exact in the Real World
  - Turning Opinions and Feelings into Numbers
  - Turning Numbers into Ideas and Decisions

FORD ACADEMY OF MANUFACTURING SCIENCES

Information Systems

Course Outline

- *Unit One: Introduction to Information Systems*
- *Unit Two: Using Computer-Based Information Systems*
- *Unit Three: Using Information Systems to Make Manufacturing Decisions*
- *Unit Four: Developing Information Systems*
- *Unit Five: Careers in Information Systems*

Course Description

This course is designed to introduce students to a variety of information systems used to support the world of manufacturing. Students learn that all information systems involve people, hardware, software, and data and that these systems can range from paper and pencil to sophisticated computer technology. During this course, students gain practice in using Microsoft Office, on-line services (Internet, America On-line), and Taylor II simulation software. In addition, students have the opportunity to develop an information system for other members of their school.

Course Outcomes

- Describe the purpose and major elements of an information system.
- Demonstrate the ability to use a computerized operating system, word processing program, database program, and spreadsheet program.
- Describe three major types of information systems in a manufacturing organization.
- Use information systems and simulation software to make manufacturing decisions.
- Use a life cycle model to create an information system for solving real-world problems.
- Create an information system that provides users with knowledge of careers in Information Systems, as well as the education and skills required to enter those careers.

Course hardware and software

- IBM compatible PC's
- Windows version 3.1 or higher
- Microsoft Office version 4.2

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Recommended teacher: Computer Science, Mathematics or Technology

FORD ACADEMY OF MANUFACTURING SCIENCES
Information Systems Course Outline

◆ ***Unit One: Introduction to Information Systems***
- What is an Information System?
- Different Types of Information Systems
- The Importance of Good Information
- Critical Thinking
- Ethics and Information Systems

◆ ***Unit Two: Computer-Based Information Systems***
- Introduction to Computer Hardware
- Introduction to Computer Software
- Microsoft Office Word Processing
- Microsoft Office Excel and Database
- Operations Information Systems
- Knowledge-Based Information Systems
- Strategic Planning Information Systems

◆ ***Unit Three: Using Information Systems to Make Manufacturing Decisions***
- Information Systems in Manufacturing Plants: An Overview
- Computer-Integrated Manufacturing
- Applications of CIM Technology
- Using Simulation Software to Analyze a Process
- Using Simulation Software to Increase Productivity
- Using Simulation Software to Make Manufacturing Decisions

◆ ***Unit Four: Developing Information Systems***
- Systems Development Tools
- Systems Planning
- Systems Design
- System Development
- System Launch
- System Support

◆ ***Unit Five: Careers in Information Systems***
- Researching IS Careers
- Creating a Career Information System
- Implementing a Career Information System

JST

Job Skill Technology, Inc.

114 Washington Avenue
Bay City, MI 48708

(517) 894-7143
FAX: (517) 894-9028
1-800-783-5780

3926 Brown Street
Flint, MI 48532

(610) 234-4780
1-800-783-5780

Somerset Building
21711 W. 10 Mile Road, Suite 123
Southfield, MI 48075

(810) 357-5686
FAX (810) 357-6608
1-800-783-5780

Statistical Process Control Training and Implementation Program (SPC-TIP)

What is SPC-TIP?

Developed by IBM, and now being used by many world class manufacturers, SPC-TIP is a highly interactive, self paced, multimedia training system that helps you maximize your SPC implementation savings.

How does it work?

With SPC-TIP operators, supervisors and teams understand SPC as never before. Using a CD-ROM capable computer, they interact with online trainers who make SPC concepts come to life. They receive crisp instruction, answer questions, see workplace examples, complete practice exercises, get immediate feedback, review, redo and take tests, all at their own pace. SPC-TIP is an engaging and fun way to learn SPC, Process Capability and DOE. Darts, marbles, cooking, cars and swords are just a few of the engaging props used to increase understanding and build mastery. When you confirm you mastery at the end of each lesson, you know you are ready to help your team implement SPC.

> *"...excellent, with no high-brow dialogue from gurus which has been known to scare the wits out of plant operators, if not some engineers ... best material, overall, that this reviewer has seen on this subject matter for this educational level in any form.."*
>
> **Richard Stokes, Consultant**
> **American Productivity & Quality Center**

What is the content?

SPC-TIP consists of four distinct, yet integrated Course Groups:

- **SPC Starter Kit** (3-5 hours, 2 CDs) presents the basic fundamentals of SPC by explaining types of data, causes of variation, histograms and control charts in a way that achieves broad buy-in.
- **Applying SPC** (6-8 hours, 2 CDs) teaches operators how to select control parameters and how to calculate, interpret and take corrective action based on attribute and variables control charts.
- **Process Capability** (6-8 hours, 3 CDs) explains control limits, spec limits, populations, samples, normal curves, Cp, Cpk and indices in order to help teams focus on processes needing improvement.
- **Using Design of Experiments (DOE)** (3-5 hours, 3 CDs) teaches, from an operator perspective, how to reduce common cause variation and improve processes by applying the five phases of DOE (Plan, Design, Run, Analysis and Act).

How is it implemented?

As a proven SPC implementation approach, SPC-TIP features Manager's Workshops, Implementation Sessions and Preparation Meetings that facilitate the application of SPC to the manufacturing line. Manager and operator involvement is kept at a distinctly high level throughout the process.

> *"SPC is fun to use and gives more authority to the operator. With SPC, we operators have better control over our machines and over our process center and that makes me feel good about my job."*
>
> **IBM Production Employee**

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To learn more about SPC-TIP call The Quality Group's representative: JST, Inc. at 1-800-783-5780.

What materials are provided?

A Student Guide, containing additional examples, practice exercises and reference information, is provided with each SPC-TIP Course Group. Additional materials include:

- **SPC-TIP Executive Overview** prepares executives to sponsor the SPC implementation.
- **SPC-TIP Program Manager's Guide** helps coordinate the SPC-TIP approach.
- **SPC-TIP Facilitator's Guide and Manager's Workshop Video** aids with Manager's Workshops and Implementation Sessions.

"Our SPC-TIP test scores showed that one-on-one interaction with the computer allows the student to pace himself, retain information at a high level and be trained without having to shut down operations or use overtime to keep those operations running. SPC-TIP has also given our supervisors a chance to learn SPC in an environment that frees them from the responsibilities of their departments and the pressure they have to 'know more than their subordinates.' "

Jay Kaplan, Quality Assurance Manager
Stone Container Corporation; (312) 580-4853

Is it easy to use?

SPC-TIP's powerful training management system frees students to learn at their own pace and liberates training managers from time-consuming administration. Features include:

- Easy course installation and setup
- Complete online user manual and interactive help
- Comprehensive tracking and reporting
- Customization features for trainers
- Pre-test and Post-test options
- Video, audio, graphics and closed captioning

A true substitute for classroom training!

The need for consistency, speed, less disruption, and lower costs drove a team of IBM site statisticians and process engineers, plus instructional designers and video producers, to develop SPC-TIP so that traditional classroom training would no longer be necessary. Today, SPC-TIP is being used by many companies to reduce instructor, consultant, facility and public class expense plus achieve higher retention, faster training, scheduling flexibility, and more hands-on SPC support. With SPC-TIP, manufacturing can truly lead the implementation of SPC.

What do people say about SPC-TIP?

The SPC-TIP training is incredible...I really enjoyed it...It is so convenient and training can be completed without stopping production.

Doug Doster, Quality Engineer
Amana Corporation, a Division of Raytheon Company

"We have found the SPC-TIP approach to be the most efficient, economical and comprehensive way of implementing SPC and achieving significant, documented savings."

Gary Klipp, Site Statistician
IBM Corporation, (704) 594-1814

"After taking the Process Capability and DOE course, our team was able to test and document the affect of changing several variables...we determined what the best process really was..this documented process enabled us to meet ISO 9000."

Jay Kaplan, Quality Assurance Manager
Stone Container Corporation; (312) 580-4853

SPC-TIP was vital in our attaining Ford's Q1...It provided everything we needed, and our people could take the course at their convenience, without effecting the workload or disrupting production."

Quality Manager
Pratt & Lambert United

ISO 9000, QS-9000 ISO 14000

The following Courseworks is available on interactive CD Rom for companies interested in ISO and QS Registration and Compliance. The program was reviewed by Reality International and is ASCG approved. It is a complete library that includes the following courses:

ISO 9000 REGISTRATION SERIES

DESCRIPTION

Understanding the ISO 9000 Process -- Foundation Education
Preparing for Registration -- Project Planning Essentials
The Registration Process -- Implementing the Quality System
Internal Auditing -- Training the Internal Auditors
ISO 9000 Registration Series (5-CD Set)
ISO 9000 Registration Maintenance Toolkit (2-CD Set)

QS-9000 COMPLIANCE SERIES

DESCRIPTION

Managing the QS-9000 Process
Building and Implementing the QS-9000 Quality System*
Internal Auditing for QS-9000
QS-9000 Compliance Series (4-CD Set)

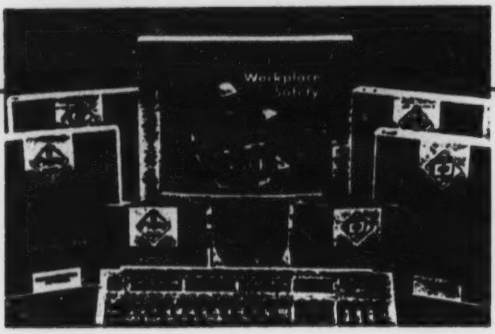
INDUSTRIAL TRAINING CENTERS

JST, Inc. can provide complete turn-key industrial training centers, including computer network, software furniture, curriculum, service, support, and teachers.

1-800-783-5780

Interactive CD-ROM Courseware

- Safety
- Health
- Regulatory Compliance



Maintaining a safe and healthy work environment is more important today than ever before. Yet at the same time, the challenges of conducting Safety & Health Training and Regulatory Compliance activities are greater than they have ever been. Pulling groups of employees away from their jobs at the same time can be difficult... many employees are "geographically dispersed" and new employees are coming in the door all the time. Add the increasing requirements to document the "learning" process, and the training equation gets even more complex.

Courses from The Interactive CD-ROM Training Library™ solve these problems! With CD-ROM employees can receive training on their own PCs... on demand... any time... and at their own pace. CD-ROM programs also increase information retention by directly involving employees in the learning process. They can... "See"... "Hear"... and "Touch"... their training material.

TRAINING COURSES

Using a powerful combination of audio, full-motion video, text and colorful graphics, Courses from The Interactive CD-ROM Training Library™ provide the most cost-effective Safety and Regulatory Compliance training available today. The Courses feature both INDEO and MPEG compatibility, platform software which installs automatically, and comprehensive User's and Trainer's Guides. Each course is 30 to 45+ minutes long, depending on the topic. Courses are divided into a number of logical sections, so information is easily understood... and retained. The following topics are currently available. Courses on other topics are also being developed.

Safety and Health

- Safety Attitudes and Actions
- Back Safety
- Basic First Aid
- Hearing Safety
- Driving Safety
- Personal Protective Equipment
- Slips, Trips & Falls
- Electrical Safety
- Respiratory Safety
- Hand, Wrist & Finger Safety
- Fire Prevention & Safety
- Forklift Safety
- Safety Showers and Eye Washes
- Eye Safety
- Fall Protection

Regulatory Compliance

- Right-To-Know
- Bloodborne Pathogens
- Lock-Out/Tag-Out
- DOT HM-126F General Awareness
- DOT HM-126F Safety Training

Also designed with the Training Manager in mind, all Courses in The Interactive CD-ROM Training Library™ include a Training Management System (at no additional cost). Using this System, trainers can define and set up curriculum... establish log-in procedures... even create custom test questions. The System also allows employee performance information to be collected and organized through a powerful relational database, which can generate a number of record-keeping and tracking reports.

POSTERS AND BOOKLETS... supplement the Courses.

Posters

Brightly colored Posters are also available on each CD-ROM training topic. They can be placed in halls, lunchrooms and other work areas for maximum impact... to catch employees' eyes and remind them to "Think Safety"!

Employee Booklets

Booklets on each CD-ROM training topic are available in packages of 15. Both text and illustrations are used to review the important points on the Safety/Health topic. All Booklets are 16 pages in length and reinforce the points made in the CD-ROM Course.

COMPLIANCE MANUALS... available on some topics.

These Manuals are the "cornerstone" of a Regulatory Compliance program. They focus on making sure the "basics" of the regulation are clearly understood, so that you will know what actions must be taken to bring your operation into compliance. Most importantly, each Manual contains a complete "fill-in-the-blank" Written Compliance Program that can be customized to a facility's operations. "Computerized" versions of the Manuals include a 3.5" disk formatted for WordPerfect 5.1 (DOS) containing the Written Program... which makes it easy to insert and revise the required site-specific information. Manuals are available for the following regulations:

- "Right-To-Know"
- Lock-Out/Tag-Out
- Bloodborne Pathogens

Computer System requirements for CD-ROM Courses: 486/66 or better; 8 MB RAM, 40MB hard disk space; Sound board; Speaker system; 256-color VGA display; 1MB RAM Local video bus; CD-ROM drive, double speed or better.

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TRAINING COURSES and BOOKLETS

The interactive CD-ROM Training Library™ Courses and Employee Booklets provide comprehensive information on the topics they address. Each Course and Booklet organizes the information into "sections", making it easy for employees to understand and remember. Information covered in the Courses and Booklets includes, but is not limited to:

Regulatory Compliance

Right-To-Know
- Chemical hazard concepts.
- Material Safety Data Sheets.
- Types of hazardous chemicals.
- Characteristics & effects.
- Safe handling practices.
- Container labeling.
- Use of PPE.
- Spills and clean-up.

Lock-Out/Tag-Out
- Major compliance requirements.
- General Lock-Out/Tag-Out concepts & procedures.
- Locking and tagging powered systems such as Electrical, Hydraulic and Pneumatic equipment.

Bloodborne Pathogens
- Contents of the Standard.
- Bloodborne diseases.
- The Exposure Control Plan.
- Emergency procedures.
- Signs, labels and PPE.

DOT HM-126F General Awareness
- Review of the regulation.
- Communicating hazards through labeling, placarding and documentation.
- Recognizing hazardous materials.
- Where hazardous materials are encountered.

DOT HM-126F Safety Training
- Hazard indicators (Labels, Shipping Papers, etc.)
- Use of PPE.
- Safe chemical handling.
- Accident avoidance.
- Emergency procedures.
- Spills and clean-up.

Safety and Health

Safety Attitudes & Actions
- Developing "safety sense"
- Hazard evaluation.
- Tool use & maintenance.
- Personal protective equipment.

Hearing Safety
- How the ear works.
- Types of hearing problems.
- Causes of hearing damage.
- Noise avoidance and safety practices.
- Personal protective equipment.

Basic First Aid
- Sprains and muscle pulls.
- Lacerations and bleeding.
- Broken bones.
- Shock.
- Burns.
- CPR and artificial respiration.

Back Safety
- How the back works.
- Common types & causes of back injuries.
- Injury prevention & safety practices.
- Basic back exercises.
- Proper lifting techniques.

Fire Prevention & Safety
- Common causes of workplace fires.
- Using fire extinguishers.
- Evacuation & other employee responsibilities.
- First aid.

Personal Protective Equipment
- Areas of the body needing protection.
- Available protective equipment.
- Equipment variations.
- Matching equipment to the hazard.
- Proper use of equipment.

Slips, Trips & Falls
- Gravity, friction and momentum.
- Causes of slips, trips & falls.
- Avoidance techniques.
- The role of safety shoes.
- Ladders & other equipment.

Electrical Safety
- How electricity works.
- Fuses and circuit breakers.
- Outlets, plugs & grounding.
- Safe Work Practices.
- Lock-Out/Tag-Out.

Respiratory Safety
- How the respiratory system works.
- Causes of respiratory problems.
- Safety practices.
- Respiratory safety equipment.

Hand, Wrist & Finger Safety
- The physiology of the hand, wrist & finger.
- Identifying hazards.
- Proper work procedures.
- Tool use & maintenance.
- Using personal protective equipment.

Forklift Safety
- Equipment check-out.
- Surveying the work area.
- Correct operating procedures.
- Equipment maintenance.

Safety Showers & Eye Washes
- Types of showers & eye washes.
- Operating procedures.
- Chemical splashes.
- Helping an accident victim.

Eye Safety
- How the eyes work.
- Common types & causes of eye injuries.
- Care and safety practices.
- Personal protective equipment.

Driving Safety
- Vehicle inspection.
- Mental preparation.
- Driving at night.
- Adverse weather conditions.

Fall Protection
- Hazardous situations.
- The Fall Protection Plan.
- Preventative measures.
- Protective equipment.

COMPLIANCE MANUALS

Compliance Manuals focus on making sure the "basics" of the issue covered by the associated regulation are clearly unde stood. They also contain complete "W ten Programs" for the regulation in p and/or computerized form. The Manuals contain the following information:

Right-To-Know
- Background of the regulation.
- Major compliance requirements.
- "Fill-in-the-blank" Hazard Communication Program.
- Forms and Procedures.
- A Glossary of Terms.

Lock-Out-Tag-Out
- History of the Standard.
- Major compliance requirements.
- "Fill-in-the-blank" Energy Control Program.
- Lock-Out/Tag-Out procedures.
- A Glossary of Terms.

Bloodborne Pathogens
- Background of the Standard.
- Major compliance requirements.
- "Fill-in-the-blank" Exposure Control Plan.
- Forms and Procedures.
- A Glossary of Terms.

OTHER PRODUCTS

Interactive CD-ROM Courses on other important Safety, Health and Regulatory topics are currently being developed.

Videotape and CBT (Computer Based Training, using 3 1/2" floppy disks) programs are available for many of the above topics for training environments where CD-ROM is not usable. Videotapes, CBT Programs, Compliance Manuals, Posters and Booklets are also available on other Safety, Health and Regulatory Compliance topics.

FOR MORE INFORMATION, CONTACT YOUR DISTRIBUTOR

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Quality Safety and Health Products for Today... and Tomorrow.

2/96

Youth Workplace Health & Safety

DANGER
WATCH YOUR STEP

CAUTION
RADIATION AREA

HIGH NOISE AREA

DANGER
HIGH VOLTAGE

The Kalamazoo Valley Health/Safety Training Partners

Kalamazoo Valley Community College
Kalamazoo Association of Occupational Health Nurses
Kalamazoo County Chamber of Commerce
Safety Council for West Michigan
South Central Michigan Labor Council AFL-CIO
Teamsters Union Local # 7
UAW Region 1-D Safety Advisory Committee

This certifies that

has participated in one hour of training in a Workplace Health and Safety Orientation provided through a Safety Education and Training Grant from the Michigan Department of Labor and is therefore awarded this certificate given at Kalamazoo, in the State of Michigan.

Noreen R. Reardon
Coordinator - Noreen Reardon

School Year 1995/96
Date

Section V-B:
Plastics Skills

- There is no plastics curriculum developed specifically for high school students, although the manufacturing lessons can be applied to examples from the plastics industry. The five existing programs cited in Section 3 all use pieces of training programs developed for post secondary courses and industry training. A good place to start would be the local **community college** that does business training in introductory plastics courses such as GRCC and KVCC. See Section 2D.

- Learning labs for plastics use a variety of support materials. One of the few textbooks is Industrial Plastics. William Tobin publishes Fundamentals of Injection Molding and Practical Mold Installation which are both used by the Kent County plastics program. SPI publishes Standards & Practices of Plastics Molders which is a good reference guide.

- There are several **computer courses** for plastics molding that are appropriate for high school and community college students. They are self-paced and interactive which can be a welcome alternative to traditional classroom instruction. MATTEC produces the Injection Molding Training Program which includes six modules, a problem solving simulator, and test questions. It is relatively inexpensive and is currently being used by the Van Buren County plastics program. Routsis Associates produces several courses in video tape and interactive CD-ROM of excellent quality. Paulson Training offers six training programs on interactive CD for injection molding, safety, and SPC. Again these courses are very effective. Demo discs are available for all the computer courses.

- The Michigan Department of Education, Vocation-Technical Education Service, has published a **plastics industry task list** which could be used to develop or add to existing curriculum.

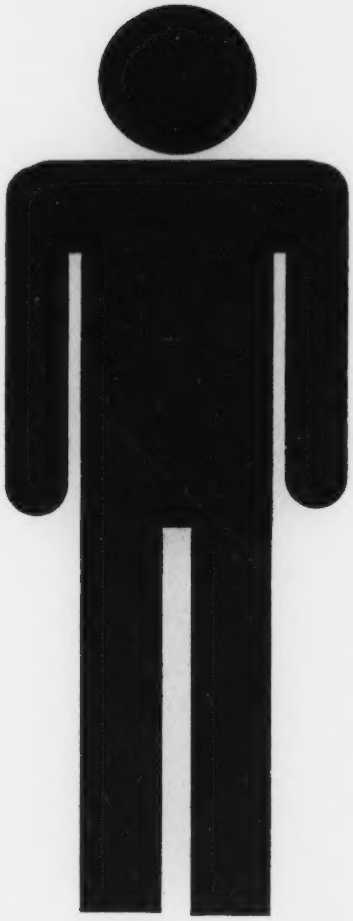
Section V-C:
Employability Skills

- Employability skills are an integral part of school-to-work programs, and an area specifically identified by plastics companies as needing improvement. For example, the Kalamazoo County Education for Employment conducted a survey of employers and published a report called The Workplace Know-How Skills Needed to be Productive. The five categories of skills are similar to other lists such as the SCANS report. There is a deliberate effort to integrate these skills into school-to-work and traditional curricula.

- Many school districts now include employability skills into career exploration and development programs. The specific skills include writing a résumé, filling out a job application, interviewing skills, and writing thank you letters. See enclosed Manual for the Job Seeker. For the **plastics school-to-work** students, these skills can be used in writing actual thank you letters for job shadowing experiences for example. Section 7 discusses these activities in more detail.

- An important area of employability for young people is having an "appropriate business attitude" which is one of the primary components for school-to-work programs. Though somewhat intangible it can be taught by teacher modeling, by emphasizing its importance, and by using frequent measures and feedback. See the attached forms Daily/Weekly Performance Evaluation, and Team Leader Evaluation Form used in the TEAM Plastics class.

- There is also recent literature on this important topic. See for example the article Behavioral Skills in the Workplace: What do Young People Need to Succeed?



The Workplace Know-How Skills Needed to be **PRODUCTIVE**

Study Synopsis

Kalamazoo County
Education for Employment
Outcomes Task Force

EQUAL OPPORTUNITY EMPLOYER/PROGRAM
AUXILIARY AIDS AND SERVICES ARE AVAILABLE UPON REQUEST
TO INDIVIDUALS WITH DISABILITIES.
MICHIGAN RELAY CENTER 1-800-649-3777 (VOICE and TDD)

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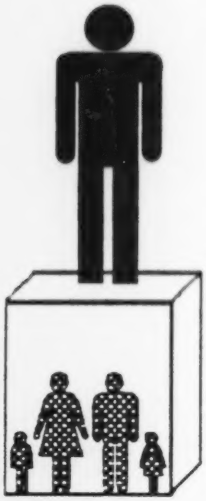
The "Intangibles"

In the world of professional sports or entertainment, we often hear the word **intangibles** used to describe why a superstar is so successful. "Her acting skills or athletic skills are excellent, but what sets her apart are the '**intangibles**'." The intangibles are characteristics and skills such as goal setting, desire, work ethic, quality, or leadership.

The Education for Employment Outcomes Task Force of Kalamazoo and St. Joseph Counties believes that another name can be used for intangibles—"workplace know-how skills." We believe that these skills and characteristics can be applied much more broadly than the worlds of entertainment or sports. In fact, they apply to **every** occupation and **every** job.

Employers in our communities agree with us. They told us the most important skills and characteristics that workers, **in any position**, require in order to be productive and to succeed. These skills and characteristics are as follows:



Individual + Family and Community

Basic Academic Skills

Basic reading skills
Basic verbal skills
Writing skills
Listening
Basic math skills

Personal Characteristics

Honesty; integrity
Responsibility
Lifelong learner; willingness to learn
Initiative; self-starter; motivation

Task Achievement Competencies

Attendance
Punctuality
Flexibility
Problem solving
Common sense
Time management
Consistently accurate; understands quality concept

Organizational Behaviors

Understands and embraces mission; understands "big picture"
Takes ownership; empowered

Interpersonal Skills

Teamwork skills
Works well with co-workers
Customer orientation
Sociability
Respects diversity

What Are These Skills and Characteristics?

We have classified the skills and characteristics that employers told us about into five areas: **basic academic skills, personal characteristics, task achievement competencies, organizational behaviors , and interpersonal skills**. The first set of skills—**basic academic skills**—comprise areas of cognition expected by employers. Employers expect every person that applies for a job to have attained some minimal level of achievement in communication and mathematics skills.Applicants and workers who display deficiencies in these skills **cannot** succeed.

The second set of skills—**personal characteristics** comprise the values that individuals rely on as they interact with their social environment. These characteristics are nurtured by families, friends, and significant others. The third set of know-how skills are labeled **task achievement competencies**. They represent **methods or processes** that individuals use to achieve any given task. They can be employed in almost any work setting as well as in a learning activity. They can and should be reinforced in school settings, family, and work environments.

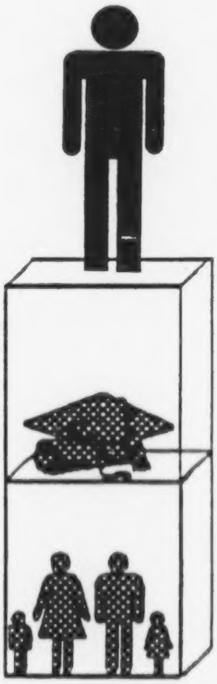
The fourth set of skills are individual **behaviors with respect to an organization** or employer. In particular, employers said that productive workers must understand and support the organization's mission and feel empowered to take appropriate decisionmaking actions. The final set of skills define how workers relate to others, or **interpersonal skills**. In the workplace, individuals must relate to two general populations—co-workers and customers.

How Do We Know that These Skills and Characteristics Represent a Consensus of Employers?

The EFE Outcomes Task Force conducted a study to identify the "most important" workplace know-how skills expected by employers. A dozen small-group meetings were convened between mid-November 1993 and January 1994. Each meeting, attended by 10-12 employers, focused on a particular sector of the local economy.

A total of 103 individuals participated. They represented companies or organizations across the economic spectrum—from manufacturing to services to public employers. About one-third of the organizations employed fewer than 50 individuals and a little over one-quarter employed more than 250. The remaining organizations employed between 50 and 250 workers. More than half of the participants were owners or management staff; about one-fifth were Human Resource Department (HRD) managers or staffpersons; and the remainder were supervisors or other staff members. There was an equal split between men and women and approximately 9 percent of the participants identified themselves as members of a minority ethnicity. Over two-thirds were between the ages 35-54 and about one-fifth were in the 25-34 range.

The intent of the process that was followed in each meeting was to consider workplace know-how skills from a very broad perspective and to funnel the discussion to more specificity. First, the meeting participants listed independently all of the workplace know-how skills that they felt contributed to a worker's productivity. Next, the participants worked together to compile a "master list" of know-how skills for the group. After the group's compilation was completed, the participants prioritized the skills and characteristics by voting. Consensus was then achieved by examining the top "vote getters."

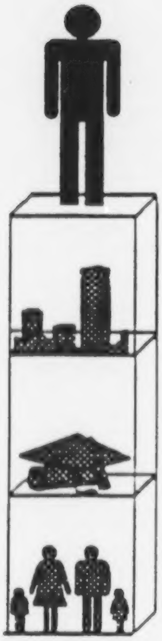


+ Education and Training

Can We Measure and Set Standards for these Skills and Characteristics?

It is one thing to come to a consensus about what are the most important skills and characteristics and it is quite another to agree about how to measure them and what standards to apply. Nevertheless, the Outcomes Task Force attempted to guide the groups to identify measurable standards for the skills.

For basic academic skills, employers will generally use successful completion of high school courses as their measure (presumably verified by



+ Business
and Industry

transcripts). A number of employers indicated that they have been disappointed with the actual skills levels of labor market entrants, even when they had completed appropriate high school courses. Some employers have begun applicant screening using existing or customized tests.

Employers said standards for poor attendance and tardiness depended on the overall "tightness" of the labor market. When the labor market is tight, i.e., when unemployment is low, standards are reported to be more lax. The **measure** that many employers use for attendance is the percentage of days for which the worker is scheduled that the worker actually comes to work. The minimum **standard** applied was around 95% (about one absence/month). Employers monitored tardiness most closely during the first few months of employment . Three or more incidents of tardiness during this time period would jeopardize employment.

Honesty and respecting confidentiality are measured by incidents of dishonesty or breaches of confidentiality. Employers had little tolerance for either,. uniformly indicating that they had zero tolerance for theft or cheating (e.g. falsifying time cards), and for breaches of confidentiality.

Employers were not able to come to agreement on how best to measure other skills and characteristics. Suggested methods included direct productivity measures (e.g., customer complaints or on-time shipments); documentation of specific skills or characteristics (e.g., employability portfolios that document incidents of problem solving, time management, or attention to detail); or subjective assessments by a third party (i.e., references).

Recommendations and Future Actions

Part of the reason for forming the EFE Outcomes Task Force was the sense among many groups in the community that there exists a "skills gap"—the basic skills that employers expect are not matched by the skills that applicants or workers possess. This perception was confirmed in the employer focus groups. Participants not only identified important workplace know-how skills, but indicated that many job applicants and workers lacked these skills.

After conducting this study, the challenge of the Task Force is to find how to improve the system and narrow the "skills gap." Can local education and training providers improve curricula or instructional methods to better teach workplace know-how skills to individuals being prepared for the labor market? Can local business and industry become more involved in identifying needs and standards and assist education and training providers?

The first step in answering these questions is to determine what education and training providers are currently doing. Thus coincident with this study, the Task Force is preparing an inventory of area education and training programs. This inventory is examining curricula and instructional practices offered by local providers to determine the extent to which workplace know-how skills are present. After the inventory is completed and analyzed, the Task Force intends to bring together employers, educators, and trainers to work on implementing a system that addresses these skills. Options range from facilitating dialog between the staffs from the institutions that prepare individuals for work and employers to a portfolio or passport system, in which labor market participants provide certified evidence of the attainment of particular skills or characteristics.

In any case, the task force is convinced that little change to the status quo can be affected without the active involvement and support of educators, trainers, employers, parents, and peers.

This study synopsis summarizes a study conducted by the EFE Outcomes Task Force. An executive summary and a full technical report are available upon request. Contact the EFE Outcomes Task Force, in care of the Kalamazoo Valley Intermediate School District, 1819 E. Milham Road, Kalamazoo, MI 49002. Telephone (616) 381-4620.

The data collection and development of this report were made possible through a grant awarded by the Michigan State Board of Education under the Job Training Partnership Act (JTPA) 8% State Education Coordination and Grants Program. The EFE Outcomes Task Force gratefully acknowledges the Kalamazoo-St. Joseph Private Industry Council and the Kalamazoo-St. Joseph Designated Education Planning Entity for their generous support. The opinions and views expressed do not necessarily represent those of the funding agencies.

Section VI
Plastics STW Components and Tools

A. **Class Activities**

B. **Visitors and Tours**

C. **Job Shadowing**

D. **Student Portfolios**

E. **Student Internships**

F. **Apprenticeships**

G. **Evaluation**

Section VI
Plastics STW Components and Tools

Section VI-A:
Class Activities

- Even the classroom portion of a school-to-work program is very different from traditional high school. First it is important to establish **ground rules**: the class is managed like a business with rules and responsibilities. See the attached documents from the TEAM Plastics class: Guidelines for Achievement and Behavior, Measures of Performance, and Evaluation Forms.

- Business Reports can be used to supplement classroom material and to integrate the skills of reading, writing, and presentation. It simulates the business practice of one person investigating a certain area of knowledge and reporting back to their work group. Interview Projects add the elements of questioning and peer review. There are also numerous videos available that demonstrate some key points for students. Included here is a sample worksheet from FAMS to help students stay on task.

- A sample lesson for first year plastics students is the use of the Trouble Shooting Guide to learn about plastic part defects. The students are given the guide and are shown numerous examples of actual plastic parts with typical defects. Then students are assigned the task of finding at least three plastics parts around the house that illustrate some of the defects.

- Students participate in many group activities to learn **team problem solving**. The FAMS curriculum for example uses about 50% of class time for group activities in which students use brainstorming and interpersonal skills to solve a problem or apply a principle to a case study.

- Students also use **computers** extensively in the classroom. They compose business reports, thank you letters, and resumes with Word Processing. MINITAB, a statistical package widely used in industry, is used to perform data analysis and make SPC charts. Students also use the computers for the CD-ROM courseware described in Section 6.

TEAM Plastics Class

Guidelines for Achievement and Behavior

To prepare for employment and to promote effective group functioning, the classroom is managed like a "business". You the "employee" are expected to achieve basic work standards and are responsible to comply with "company rules".

Since the classroom simulates the business environment it reflects generally accepted norms pertaining to basic skills, attendance, dress, performance, and attitude. Compliance will earn students an 'A' or 'B' grade and a recommendation for a job internship or summer job. Norms for achievement and behavior are as follows:

1. Basic Academic Skills
    - a. reading skills: accomplished by weekly reading assignments and reading aloud in class.
    - b. verbal skills: accomplished by participating in class discussions and making weekly presentations.
    - c. writing skills: accomplished by writing weekly summaries and other business communications using the computer.
    - d. listening skills: accomplished by actively listening to presentations and discussions.
    - e. math skills: accomplished by working on in-class problems applicable to industry with groups and on the computer.
2. Personal Characteristics
    - a. integrity: makes best effort, is honest, and respects others' personality, time, and property.
    - b. responsibility: accountable for behavior and performance.
    - c. willingness to learn: accepts new activities, open to other perspectives, tries to integrate experience.
    - d. initiative: is self-directed, demonstrates motivation, assumes leadership when appropriate.
    - e. appearance: dress and grooming conforms to business environment.
3. Task Achievement Competencies
    - a. attendance: absenteeism is less than 10%, comes to class prepared to work.
    - b. punctuality: late-ins and early-outs are less than 5%, starts work on time.
    - c. flexibility: willing to try different approaches, tolerates ambiguity.
    - d. problem solving: is creative, resourceful, and uses the steps and tools of problem solving discipline.
    - e. common sense: understands task and process, uses good judgement.
    - f. time management: quick to begin tasks, stays on task, and completes tasks; respects company time.
    - g. quality concept: consistently accurate, accepts team goal, strives for continuous improvement, maintains work area.

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4. Organizational Behaviors
    a. accepts mission: understands the big picture, demonstrates team orientation.
    b. takes ownership: understands individual role, facilitates group performance.
    c. empowerment: strives to improve products and processes, contributes to positive work environment.

5. Interpersonal Skills
    a. teamwork: is a productive member of the team, understands and demonstrates the importance of group process.
    b. cooperation: works well with others.
    c. customer orientation: strives to provide excellent service for both internal and external customers.
    d. sociability: strives to get along with others, engages in appropriate conversation, is courteous.
    e. respects diversity: is tolerant, accepting, and encouraging of individual differences.

Every "employee" is expected to achieve the basic standards. Performance will be measured on a daily basis and reported weekly. Students will receive appropriate feedback for self-development to help performance stay on track. Any performance problems will be handled on an individual basis.

TEAM Plastics Class

Measures of Performance

The following are specific Performance Indicators which meet the standards of basic responsibilities and courtesies.

ATTENDANCE / PUNCTUALITY: Each absence must be accounted for by a verbal report to the instructor or written excuse when needed. Absences exceeding 10% in a semester can be made up by extra assingnments. Excessive absenteeism will handled individually and may include loss of credit. Since the class functions as a group it is also important to start on time. This includes starting up after a break or other planned activity. Tardiness will be measured and enforced.

ATTENTION / EFFORT: In the work world we are responsible for performing our jobs and not disrupting the performance of others. Therefore each employee must pay attention and take notes, listen during presentations, stay on task, and avoid visiting with others during work time. It is inappropriate to slouch, lay your head down, sleep, play with toys, throw things, or work with any non-class materials during work time. This may be difficult at times since not all activities hold our complete attention, but doing your best even when you may not be personally motivated demonstrates maturity and discipline.

TASK ACHIEVEMENT: In-class work is normally completed as a team. Each team member is responsible to make sure the team accomplishes its goal. The team will evaluate its own performance daily.

INDIVIDUAL ASSIGNMENTS: Executive summaries are due every Wednesday unless otherwise noted. If you miss a summary for whatever reason you have till the following Monday to hand it in, although it will be graded down for being late. After Monday you will lose credit for the week unless special arrangements are warranted. Other individual assignments will occur as appropriate.

WORK AREA: We treat the work area like company property, and each employee is responsible for maintaining it. There should be no materials on the tables other than those that are being used for the current class. After class you must take, discard, or store all hand-outs, notes, etc. There should be no food or drink on the tables during work time, and nothing on the computer tables at any time.

APPEARANCE: We will maintain a business atmosphere similar to a casual office environment. No hats are to be worn during class time. No shirts with slogans that have anything to do with

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promoting drugs, alcohol, tobacco, sex, or violence. Jeans are okay if they do not have holes or patches. No sweat pants or cut-offs. A shirt with sleeves and collar is desireable.

BEHAVIOR: Students are accountable for conducting themselves as working adults. This requires cooperation and self-control to maintain a pleasant, productive environment. Any behavior that is disruptive will not be tolerated, therefore we need to:

- listen and follow directions
- do not interrupt others or talk when not appropriate
- do not be argumentative or insubordinate
- no sarcasm or profanity
- be courteous and respect diversity
- avoid personal issues on company time
- respond positively to constructive critcism

TEAM Plastics Class

Daily / Weekly Performance Evaluation

Name: ______________________________ Week Ending: ______________

ASSIGN 0 - 4 POINTS FOR EACH INDICATOR EACH DAY

Performance Indicators	Mon	Tue	Wed	Thr	Fri
1. Attendance / Punctuality: attended class, not late in or early out, started work on time	___	___	___	___	___
2. Attention / Effort: **(X2)** pays attention, listens, not disruptive, participates	___	___	___	___	___
3. Task Achievement: **(X2)** follows directions, stays on task, completes work, helps team	___	___	___	___	___
4. Individual Assignments: contributes to team, completes summaries and other work	___	___	___	___	___
5. Work Area: clean, orderly work space, helps maintain the room	___	___	___	___	___
6. Appearance: conforms to casual business environment	___	___	___	___	___
7. Behavior: **(X2)** courteous, positive attitude, practices self-control	___	___	___	___	___
Total Points / 10 = **Daily Grade:**	___	___	___	___	___

Total Daily Grades / 5 = **Weekly Grade:** ___

Action Plan for Improvement: ______________________________________

____

____

Instructor Comments: ____

____

____

Semester Grade to Date: ___

TEAM Plastics
Team Leader Evaluation Form

Leader: ____________________ Assistant: ____________________ Date: _______

Assign points as follows: 0 = insufficient effort
1 = below average effort
3 = average effort
5 = excellent effort

	MON	TUE	WED	THR	FRI
ABILITY TO DIRECT AND MOTIVATE Directed others and devised strategies to keep the team on task. Your team maintained a professinal tempermentand was respectful to presenters and other students.	___	___	___	___	___
ENVIRONMENTAL ISSUES Table tops are free from paper, magazines, and garbage. Folders and books are put away. Chairs are pushed in. Floor area is clean.	___	___	___	___	___
COMMUNICATION AND EVALUATION SKILLS Team is evaluated according to policy and procedure. Detailed comments are recorded in progress report and action plan is outlined.	___	___	___	___	___
ORGANIZATIONAL SKILLS Work is returned to team members. Helps absent members catch up. Activity reports are done and turned in. Delegates effectively when needed.	___	___	___	___	___
DAILY TOTALS	___	___	___	___	___

* WEEKLY TOTAL _____

* note: this total represents your application for team leader points.
Your actual grade may differ.

TEAM Plastics
Business Reports

Completing Business Reports will help you 1) gain additional knowledge abut interesting manufacturing topics, and 2) improve your reading, writing, and presentation skills. These reports will prepare you to analyze, summarize, and present technical information in a business format. This skill will help you in the workplace because employers need people who can organize and communicate their thoughts clearly and concisely.

Each week you will find and read an article on a manufacturing topic that interests you. I suggest magazines such as Industry Week, Plastics World, and Plastics Engineering. There is a limited supply of magazines in the classroom to get you started, but eventually you will need to use your local library. Newspaper articles are not appropriate because they are typically very brief.

Read the article, looking for the key points that your audience will want to know about. Then write a report on the article: one paragraph summarizing the content, and one paragraph on your reactions to the topic. For our purposes a paragraph should be 5-7 sentences. Try to paraphrase the material in your own words; if you use direct quotations from the article they must be cited properly. The reports are to be typed, preferably on a computer using Word Perfect. Be sure to spell-check. Half of a class period, once per week, will be reserved for working on reports. You will need to include bibliographical information in your report and attach a photocopy of the magazine article.

The reports are due every Wednesday that there is a full week of school. Each student will orally present a two minute report on their article. Be prepared to answer questions from your peers and to lead a discussion about the topic. Grading will be A, B, C. Late reports will be graded down.

TEAM Plastics Class

Career Opportunities Assignment

Starting this semester we will begin another weekly assignment. The objective is to familiarize you with positions at local plastics companies, and to determine the kind of experience and education required for those jobs.

PROCEDURE: Obtain the Sunday edition of the Kalamazoo Gazette and read the "help wanted" section of the classified adds. Scan for job openings from plastics companies; the adds are arranged alphabetically. You might look under headings such as:

Data Processing
Engineering
Factory
Industrial
Manufacturing
Plastics
Quality
Tooling

Copy or cut out at least three adds from plastics companies; circle the education and exprience requirements of each position. You will hand in your adds every Monday so we can discuss them briefly.

INTERVIEW PROJECT

Find someone you know who works for a manufacturing company. Subjects could be a parent, relative, neighbor, friend, etc. Interview the person about the company and their work using the questions below as a guide. Take good notes so you can prepare a summary. You will make a two-minute verbal presentation to the class on OCTOBER 2. Grading will be based on peer review.

This project is designed to benefit the entire class. We will learn about the company you have chosen, and you will gain valuable experience from the research and presentation. Later in the year we will do a similar project only in more detail.

Suggested Interview Questions:

Where do you work? What is your job? How long have you worked there?

What kind of company is it? What size? How old?

What products does the company make? Who are some of their customers?

What materials go into the product?

What machines are used to make the product?

What kind of computer system do they use?

What career opportunities are available?

What makes this company unique or special?

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INTERVIEW PRESENTATION

Audience Evaluation

Name of Presenter: ______________________________

Company they interviewed: ___________________________

Type and size of company: ___________________________

Products and customers: ____________________________

The presenter:

1. appeared knowledgeable about the subject	1	2	3
2. got good information from the interview	1	2	3
3. got extra information about the company	1	2	3
4. seemed well prepared to present	1	2	3
5. was interested, enthusiastic	1	2	3
6. posture was appropriate	1	2	3
7. no distracting mannerisms	1	2	3
8. used language effectively	1	2	3
9. volume of voice was adequate	1	2	3
10. had good eye contact with audience	1	2	3
11. made me want to listen and learn more	1	2	3

Suggestions for improvement:

Name of evlauator:

STUDENT COPY

WIXOM ASSEMBLY PLANT - PUTTING PEOPLE FIRST

1. How big is the Wixom Assembly Plant?

2. What are the five areas used in assembling a car?

3. How long does it take to assemble a car from start to finish?

4. How do machines make the workplace safer?

5. What is Employee Involvement?

6. Why is teamwork important?

7. Why is quality important?

Plastics STW Components and Tools

Section VI-B:
Visitors and Tours

- These are some of the most common activities. The **guiding principal** here is that teachers and plant personnel should carefully coordinate the visit or tour to integrate classroom material. For example, as an introduction to the subject of dimensional variation of plastic parts, a quality manager of a plastics company visited the TEAM Plastics class; he brought a box of parts, the blueprint, and several micrometers so students could actually measure a set of parts. For additional preparation see the accompanying handout Release Personnel to Teach in Schools by MTAG.

- The same principal applies for conducting tours. See the handout Conduct Plant Tours for Students. Also, FAMS recommends that teachers and students use a **worksheet** on the tour to help focus on specific topics such as quality or costs. See the Manufacturing Field Study Guide. As a courtesy and time saver for the business, students could bring their own safety glasses.

Release Personnel to Teach in Schools

Purpose

Encouraging company employees to work in the schools is a good way to demonstrate workplace realities to students. Depending on the needs and interests of the company and the school's Tech Prep program, employees may be released to the schools to:

- tutor students in specific content areas
- teach a class

Through these activities, Subject Matter Experts (SMEs) can help students see the "real world" applications of what they are learning in class. In addition, employees can communicate up-to-date industry standards, levels of proficiency required in various technical arenas, and the academic requirements of their own jobs. As with plant tours, releasing personnel to teach in schools is an excellent method for beginning a partnership between a manufacturer and a Tech Prep program.

Process

The employer focal should:

- Convene decision makers to determine company policy regarding employee release to the schools, including eligible employees, number of hours per week, etc.
- Develop a tool for surveying employees regarding their interests, abilities, and availability to tutor, teach, or present information to Tech Prep students.
- Coordinate with school principal and/or Tech Prep teaching staff regarding the company's availability for these activities.

The employer focal and teacher should:

- Coordinate regarding types of involvement, subject matter, scheduling of days, time and amount of time for activities selected.
- Develop a consistent process for connecting interested employees to appropriate teaching staff.

Before scheduled activities, SME and teacher should:

- Discuss how to tailor teaching or tutoring to current classroom activities or provide foundations for coming lessons.
- Determine the information to share with students about employee, position in company, etc.
- Discuss the teaching methods that will be successful to engage students and address multiple learning styles.
- Coordinate regarding needed equipment, parking, and visitor arrangements.

Conduct Plant Tours for Students

Purpose

Offering tours is a good way to introduce students to manufacturing environments. Through plant tours, students can gain initial exposure to the aspects that comprise an industry, or to selected elements, such as technology, finance or management. A plant tour may be organized to reveal career opportunities in one or more department, or to demonstrate product flow from conception to completion. Generally, overviews of an entire business operation are less useful for high school students. A preliminary discussion between teacher and employer focal should guide how a plant tour is focused and organized.

Process

In a preliminary discussion, the employer focal and teacher should:

- Determine how the tour will be focused.
- Identify number of youth involved and whether the group will be divided.
- Determine the optimum length of time for the tour, and how it will be scheduled within the day.

Before the tour, the employer focal should:

- Plan out and time the tour route, allowing for questions and movement time.
- Identify key employees for students to meet along the way, and seek their approval.
- Consult the company legal department regarding liability and safety issues.
- Provide for any necessary safety equipment.
- Prepare any useful handouts, such as organizational charts, applications, hiring procedures, product designs, etc.
- Determine whether the company can provide lunch or any "takeaways" such as logo pins, magnets, etc.

During the tour, the employer focal should:

- Stay aware of time and try to remain on schedule.
- Help engage all students by asking prompting questions, i.e. "What do you suppose is happening in this area? Where do you think the product goes from here?"
- Encourage other employees to talk about their work.

Payoff

- Students begin connecting academics with their applications in the workplace.
- Students receive initial exposure to careers, technologies, aspects of industries, organizational structures, and how people work together within a company.
- Employers play a role in helping youth make informed career choices.
- Employees benefit from describing the roles they play within the organization

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FORD ACADEMY OF MANUFACTURING SCIENCES

MANUFACTURING FIELD STUDY GUIDE

PURPOSE:

The purpose of the field study is to provide you with an experience which will increase your general awareness of manufacturing and technology.

OBJECTIVES:

The study will provide you with an opportunity to:

- Gather information that can be shared with students, parents, and faculty members
- Begin planning field studies for your own FAMS program.

PROCESS:

Read the following questions before you begin the field study. Think about these questions during the study so that you can write answers to the questions and discuss them later.

1. Suppose you were describing what you saw to your students. List the things you think the students would find:

   A. Interesting: ______________________________

   ____

   B. Surprising: ______________________________

   ____

   C. Motivating: ______________________________

   ____

2. Identify the main point(s) that you would want to share: ______________________________

   ____

   ____

   ____

3. Give examples/situations of things you saw that can be directly related to the FAMS topics listed below:

   A. Teamwork/Problem Solving: ______________________________

   ____

   ____

Plastics STW Components and Tools

Section VI-C:
Job Shadowing

- Job shadowing can be an effective awareness and learning activity for students. Unlike a tour, the student has the opportunity to spend some one-on-one time with an employee at a company where they get to see what it is really like to work in a certain profession. First, students have to be prepared: read about the **policies and procedures** in the TEAM Plastics Job Shadow Program and the Letter to Parents. Students should also be prepared to ask some standard questions of their host such as the attached list Student Questions for Employers.

- Secondly, employers may need information about job shadowing. See the memo to Human Resources Manager describing the process. From the business perspective MTAG has prepared a fact sheet called Provide Job Shadowing Opportunities.

- The Grand Rapids Public Education Fund produced a **guide for employers** called The Experience Exchange Toolkit. Some of the supporting documents are The First Day and Working With Students.

- Finally, the student and the company host should evaluate the job shadow experience by using a form such as the ones provided: Student Self Evaluation and Employer Evaluation.

TEAM Plastics
Job Shadow Program

Policies and Procedures

1. Dress Code
    - a. Factory jobs: jeans are okay as long as they are neat.
      shirt with buttons and collar. no graphics
      safety glasses.
      no hats.

    - b. Office jobs: slacks.
      shirt with buttons and collar. no graphics
      no hats.

    - c. Corporate jobs: dress pants
      dress shirt
      tie

2. Conduct
    - a. be at the right place at the right time
    - b. bring a notebook and pencil
    - c. no food or drink
    - d. best business behavior at all times: we are guests in a place of business and must respect their time and property

3. Absences

    if you have to miss an appointment it is your responsibility to call your host to inform them and to reschedule. A no-show/no-call will make you ineligible.

4. Procedures:
    - a. report to class as ususal (unless special arrangements are made and approved)
    - b. prepare the job shadow form
    - c. travel to job shadow site: should be no more than 10 minutes depending on location
    - d. conduct meeting: ask questions and take notes. get their business card
    - e. return to class
    - f. complete job shadow forms.
    - g. prepare a presentation to class.
    - h. write a thank you letter to your host.

Kalamazoo County
Education for Employment

1220 Howard Street • Kalamazoo, MI 49008
Phone 616 / 337-0159 • Fax 616 / 337-0153

TEAM Plastics Class
April 6, 1995

Dear Parents:

One of the goals of the TEAM Plastics class is to provide each motivated student with hands on experiences in several career interest areas within the plastics industry. This feature of the class is known as the "job shadow" program. Students will be visiting several companies and spending individual time with specific professionals in Quality, Engineering, Marketing, etc. This is an excellent opportunity for students to learn first hand about actual jobs. (It is not meant to be a co-op experience, an internship, or paid work).

This letter is to inform you that your son/daughter is planning to participate in this exercise and will be scheduling one class period per week with local plastics companies during the next few weeks. If you have any questions or concerns about this program please call me at 324-1267. Students will be required to maintain eligibility by:

- completing weekly assignments;
- complying with attendance and conduct requirements;
- dressing in appropriate business attire:
- presenting a job evaluation to the class.

Please indicate your authorization for your son/daughter's participation in the job shadow program by signing below and having the student return this form to me. Thank you for your continued support.

Sincerely,

Rick Zinser
TEAM Plastics Instructor

Parent signature: ________________________________ Date: __________

THE EXPERIENCE EXCHANGE

STUDENT QUESTIONS FOR EMPLOYERS

🗎 14

These are questions typically of interest to students about the work place:

1. What is your job title?
2. What are the education requirements for an entry level position?
3. What are the skill requirements for an entry level position?
4. What are the career opportunities?
5. What are the working conditions?
6. What are the hours?
7. What is the salary range?
8. What personal qualities does the company look for in an employee?
9. What do you like best about your job?
10. What do you like least about your job?
11. What did you do in high school that prepared you for your job?
12. What did you do after high school to prepare for your job?
13. What are the personal qualities necessary to be successful in your job?
14. How did you get your job?
15. Did you have to take a drug test?
16. Did you have to take a skills, math or reading test?
17. Did you need a credential to get your job?
18. Additional questions of your own: ____________________

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TO BE FILLED OUT BY:

☐ Employer
☐ School
☐ Parent
☑ Student

RETURN TO:

☐ Employer
☑ School
☐ Parent
☐ Student

COPY TO:

☐ Employer
☐ School
☐ Parent
☐ Student

April 1, 1996

To
Human Resources Manager
From Rick Zinser
Plastics Instructor

re: Job Shadowing

Thank you for your continued support of our TEAM Plastics class. Now that we are in the second semester the Seniors are of course looking forward to graduation and good jobs. Since one of the main objectives of the class is to provide exposure to manufacturing careers, the students would like to participate in the part of our Education for Employment program known as "job shadowing". This has proven to be effective for the students' career decision making process.

The concept is to have students spend some one-on-one time with people doing actual jobs. This is not meant to be a co-op job, internship, or paid work. Rather, the students are to observe, take notes, and ask questions. The sponsors' role is to demonstrate and explain to the students what the job involves, and have them actually participate in some limited way if possible. The students will be responsible for completing a job description and evaluation form for each job they observe.

A possible structure would be to meet one class period per week for three to five weeks. For example, we could pick Thursdays from 8:15-9:15 a.m. I would like to have each student exposed to five different areas including:

CAD engineering
Sales and marketing activities
Personnel or purchasing
Machine shop
Quality control and quality lab
Production activities including set-up
Materials and scheduling

Of course we are open to other suggestions you may have.

The next step would be to set up some job shadow sites with individual sponsors willing to participate. We can then pick some dates and finalize a schedule. Please let me know within a week if possible, 324-1267.

Students will have to earn the right to be in the program, and I will make sure they are prepared, dressed properly, and have the paperwork they need. We understand that for your people business comes first so students will need to allow for different levels of activity and possible interruptions in the work routine.

Plastics STW Components and Tools

Section VI-D:
Student Portfolios

- Portfolios are widely used in schools to help students prepare for their careers. Basically a portfolio is a collection of documents, beginning as early as seventh grade, that **demonstrate a students' achievements and accomplishments**. The culmination of this process is writing a résumé and interviewing for a job or internship. One source that describes the use of portfolios in detail is the School-to-Work Workbook by St. Joseph County ISD (616-467-5400). See the accompanying section called What is a Portfolio and How Can it Help You?. Businesses can reinforce the development and use of portfolios by asking to review them during the interview process.

- An essential element of the portfolio is the **skills certificate**, and one that businesses will definitely want to see from potential employees. The example shown here is from the Kalamazoo TEAM Plastics class for the first year of the program. Feedback from human resource professionals at plastics companies has been very positive.

- Another component of the portfolio that is important for students, colleges, and employers is **college credit** for high school classes. To be awarded credit a carefully constructed arrangement called an Articulation Agreement must be developed between the school district and the local community college. Not only can students obtain college credit for completing a recognized school-to-work class, they can also take college courses during high school. In the TEAM Plastics class for example, second year students are taking the two introductory plastics classes at Kalamazoo Valley Community College and receiving dual credit. Students who complete all the requirements of the two year plastics program can graduate from high school with 10 college credits.

5. WHAT IS A PORTFOLIO AND HOW CAN IT HELP YOU?

Now that you have started learning about yourself, you need a place to collect and save this information. Think about all the information that you get every day from home and school. Your portfolio is a place to bring your best quality material together and save it.

1. **Q: WHAT IS A PORTFOLIO ANYWAY?**
A: *A portfolio is a summary of you. Such things as grades, attendance, career plans, tests, awards, and other important data can be stored in your portfolio.*

2. **Q: A FRIEND TOLD ME THAT I WILL NEED SOMETHING CALLED EMPLOYABILITY SKILLS TO GET A JOB SOMEDAY. WHAT ARE THESE?**
A: *Employability skills are the attitudes, behaviors, and skills that will be required of you to get and hold a job. These skills are considered to be essential for everyone, whether they are going to college or immediately entering the workforce.*

3. **Q: WHY DO I NEED TO PUT THINGS INTO A PORTFOLIO?**
A: *Michigan's businesses need you to be a prepared worker: one capable of solving problems, working in teams, making decisions, and communicating with others. Competition in the world is tough. Businesses need prepared workers in order to survive. Things in your portfolio will show employers how good you are and how good you could be if they hire you.*

4. **Q: IS A PORTFOLIO DIFFERENT FROM OTHER RECORDS KEPT BY MY SCHOOL?**
A: *Yes. The portfolio is your property; decisions as to what to keep in it are made by you. (Hint: Employers are looking for quality materials.) The school, and maybe partners from industry, will assist you in developing it.*

5. **Q: WHAT KIND OF "PROOF" IS INCLUDED IN A PORTFOLIO?**
A: *Information from sources inside or outside of school such as test scores, attendance awards, part-time work, volunteer work, sports, or experiences in scouting could go inside.*

6. **Q: I'M QUITE INVOLVED HERE IN SCHOOL. CAN THESE ACTIVITIES BE INCLUDED IN MY PORTFOLIO?**
A: *Certainly! The activity is matched with the appropriate skill area and stored with your portfolio dividers.*

7. **Q: I JUST STARTED SOMETHING CALLED SCHOOL-TO-WORK. DOES THIS FIT IN MY PORTFOLIO?**
A: *Yes, these activities are a very important part of your portfolio building process.*

8. **Q: I'M NOT SURE WHAT I WANT TO DO YET IN LIFE. CAN I TAKE THIS PORTFOLIO ON A JOB INTERVIEW OR, HOW ABOUT TO A COLLEGE OR UNIVERSITY?**
A: *Excellent idea! Your portfolio says good things about you. Keep it up to date and you can use it the rest of your life.*

9. **Q: CAN MY FAMILY HELP ME COMPLETE MY PORTFOLIO?**
A: *Your family can and should help you. They may know good things about you that no one else knows. Ask for their help!*

- A portfolio helps you in several ways. Pursuing further education and preparing for a career or military service are future goals to begin working toward. Strengthening your skills today aims you in the right direction. A skill is the ability to do something well. You may be surprised at how many skills you already have.
- The portfolio itself does not guarantee employment or admission to a college or the military. Portfolios are a new idea. Some employers may ask to see your portfolio; others may not. What is important is that you know what your skills and abilities are. You will be prepared to discuss your skills and perhaps convince an employer to hire you or a college to admit you.
- Your portfolio will be divided into three sections: Teamwork, Academic, and Personal Management. **THE FOLLOWING PAGES WILL HELP YOU TO BETTER UNDERSTAND YOUR PORTFOLIO.**

BEST COPY AVAILABLE

5. WHAT IS A PORTFOLIO AND HOW CAN IT HELP YOU?

5A: ACADEMIC SKILLS

Many of the **academic skills** are taught in school courses. Most of them are practiced o used in real life and on the job. **Academic skills** help prepare you for future training and education. They are your foundation for learning and working.

One section in your Portfolio is for documenting **academic skills**. Documenting **academic skills** is not difficult. Read the examples below of academic skills documentation and **THEN COMPLETE THE INFORMATION ON THE RIGHT SIDE.**

EXAMPLES

- Certificates of Achievement
- Certificates to operate equipment or machinery
- Certificates for cooperative education and career-technical education
- Certificates of participation in clubs (debate team, speech club)
- Charts and graphs from reports or papers prepared for a class
- Class performance evaluations
- Honors and awards
- Job performance evaluations
- Letters from teacher, counselor, advisor, employer, etc.
- Previous job descriptions
- Test scores (ACT, SAT, PSAT, etc.)
- Transcripts for classes in math, writing, Career-Technical Education STAR (Student Task Achievement Record), science, etc.
- Writing samples (research papers, term papers, etc.)

NOW -- IT'S YOUR TURN!

List other examples of academic skills below:

1.____________________________

2.____________________________

3.____________________________

4.____________________________

5.____________________________

6.____________________________

HINT: Plastic sheet protectors will maintain the appearance of documents that you include in your portfolio.

Did You Know?

Over twenty million people in the United States cannot read or write or do basic arithmetic.

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ACADEMIC SKILLS

Employers want you to: ↓

In the Appendix Section (the purple pages) you will find the "Academic Skills" divider that you can use to keep track of your documents.

YOUR TURN!

Practice writing in some of your academic skills below:
(some samples are provided for you)

		7	8	9	10	11	12
A1:	Read and understand written materials						
A2:	Write in the language of your career path	Research paper					
A3:	Speak in the language of your career path						
A4:	Demonstrate active listening skills						
A5:	Demonstrate effective presentation skills						
A6:	Apply basic math skills to solve problems	Math test					
A7:	Create and interpret charts and graphs						
A8:	Understand basic business principles						
A9:	Understand the basic science of your career path	Exploration field trip					
A10:	Use the tools and equipment of your career path						
A11:	Recognize problems						
A12:	Use appropriate methods and resources to solve problems						

5B: PERSONAL MANAGEMENT SKILLS

Employers want people who can take responsibility for themselves and their work. This means being dependable, working hard, doing your best, being honest, caring about your job, and doing the job right. People get fired for absenteeism, substance abuse, and poor performance. Work hard to develop your **personal management skills.**

Another section in your Portfolio is for documenting **personal management skills.** Documenting **personal management skills** is not difficult. Read the examples below of personal management skills documentation and **THEN COMPLETE THE INFORMATION ON THE RIGHT SIDE.**

EXAMPLES

- Aptitude test scores (DAT, GABT, CAPS) - see your counselor
- Attendance records
- Class performance evaluations
- Disciplinary records
- Letters of recommendation from employers
- Interest assessment tests (MOIS, SIGI, etc.)
- Job evaluations
- Personality test scores (Myers-Briggs)
- Educational Development Plan (EDP)
- Recognition awards (Employee of the Month, school and job attendance awards, etc.)
- Letters of recommendation from teachers, counselors, or coaches

NOW -- IT'S YOUR TURN!

Can you think of other examples of personal management skills? List them below:

1.____________________________

2.____________________________

3.____________________________

4.____________________________

5.____________________________

6.____________________________

REMEMBER: Plastic sheet protectors will maintain the appearance of documents that you include in your portfolio.

Did You Know?

Most people lose their jobs because they lack personal management skills.

PERSONAL MANAGEMENT SKILLS

In the Appendix Section (the purple pages) you will find the "Personal Management Skills" divider that you can use to keep track of your documents.

YOUR TURN!

Practice writing in some of your personal management skills below:
(some samples are provided for you)

Employers want you to: ↓	7	8	9	10	11	12
PM1: Produce quality work time						
PM2: Demonstrate initiative						
PM3: Be accountable for your own actions						
PM4: Attend school/work daily and on time	Award					
PM5: Meet school/work deadlines	Research paper					
PM6: Be fair, honest, polite, and respectful						
PM7: Pay attention to detail						
PM8: Follow written and verbal instructions and directions						
PM9: Prioritize and complete tasks						
PM10: Learn new skills and view change as an opportunity						
PM11: Be willing to compromise						
PM12: Identify and suggest additional ways to get the job done						
PM13: Know personal strengths and weaknesses						
PM14: Develop career plans	My EDP					
PM15: Actively pursue personal improvement						
PM16: Demonstrate job search skills						

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5C: TEAMWORK SKILLS

Developing **teamwork skills** can help you work with others. Most workers will work as part of a team to organize, plan, execute and evaluate their work. The role of the boss or supervisor will change as leadership and management become the shared responsibility of the team members. Working cooperatively with others will include more caring and sharing.

Another section in your portfolio is for documenting your **teamwork skills**. Documenting **teamwork skills** is not difficult. Read the examples below of teamwork skills documentation and **THEN COMPLETE THE INFORMATION ON THE RIGHT SIDE.**

EXAMPLES

- Awards, certificates, and letters of thanks or appreciation
- Leadership positions (president, vice-president, secretary) in an organization (4-H, Student Council, newspaper, etc.)
- Certificate for participating in an organization
- Activities you have volunteered to do
- Class evaluations from teachers, counselors, or coaches
- Transcript from related class (i.e., How to Negotiate, etc.)
- Job performance evaluation
- Job description
- Certificates of training (peer counseling, camp counseling, etc.)
- Participation in a related organization (i.e., Debate Team)
- Tape of a speech or discussion you were involved in
- Evaluation of a group project
- Participation in Junior Achievement, DECA, VICA, FFA, etc.

NOW -- IT'S YOUR TURN!

There are other examples. List several of them below:

1.____________________________

2.____________________________

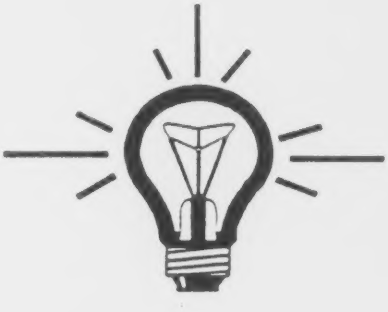
3.____________________________

4.____________________________

5.____________________________

6.____________________________

REMINDER: Plastic sheet protectors will maintain the appearance of documents that you include in your portfolio.



Did You Know?

Teamwork skills are more important in the work place of the High Tech Age than they were before.

TEAMWORK SKILLS

In the Appendix Section (the purple pages) you will find the "Teamwork Skills" divider that you can use to keep track of your documents.

YOUR TURN!
Practice writing in some of your teamwork skills below:
(some samples are provided for you)

Employers want you to: ↓		7	8	9	10	11	12
T1:	Know and follow the team's rules and values	Athletic Code					
T2:	Actively participate on a team as a leader or contributor	Band					
T3:	Listen to others						
T4:	Be able to express ideas and accept constructive criticism	Student Council					
T5:	Value individuals of differing backgrounds						
T6:	Be willing to ask for help when needed						
T7:	Acknowledge contributions and recognize successes						
T8:	Acquire conflict resolution skills						

5D: CERTIFICATE OF ACHIEVEMENT

- To assist you in proving your academic, personal management, and teamwork skills, your teacher, advisor, or employer will fill out a "**Certificate of Achievement**", which will explain the task you have accomplished.
- When you receive a "**Certificate of Achievement**", decide which skill the certificate fits best and record and place it with the appropriate divider in the Appendix (purple pages).
- Your portfolio teacher has multiple copies of these "**Certificates of Achievement**". You may need to request them from time to time to take to your employer, to your coach, or to someone who can help "prove" one of your skills.

NOW -- IT'S YOUR TURN!

List below tasks that you have accomplished at school or work that you should have a "Certificate of Achievement" for:

1.______________________________

2.______________________________

3.______________________________

REMINDER: Plastic sheet protectors will maintain the appearance of documents that you include in your portfolio.

Now, transfer one of the items you listed above onto the "Certificate of Achievement" on the next page.

SAMPLE

Certificate of Achievement

This is to certify that

____

has successfully completed the following employability skills:

____

____

Signed this day, the ______ of ____________, 19___.

____
Teacher/Advisor/Employer

TEAM PLASTICS

The following outcomes make up the Education for Employment training program. Those marked by the teacher indicate competence by the student.

Course One: The World of Manufacturing

INTRODUCTION TO MANUFACTURING
____ Terminology
____ Problem solving strategies
____ Communication skills

PRINCIPLES OF ECONOMICS
____ Economic systems
____ The market environment
____ US economic indicators
____ Production possibilities
____ Supply and demand

HISTORY OF MANUFACTURING
____ Who's who in manufacturing
____ Evolution of manufacturing

MANUFACTURING SYSTEMS
____ Organizational systems
____ Organizational structures
____ Manufacturing functions
____ Integration of functions

MANUFACTURING PROCESSES
____ Planning for production
____ Production processes
____ Designing the process
____ Changing the process
____ Measuring the process

MEASURING QUALITY
____ Importance of evaluation
____ Meeting the standards
____ Variation
____ Information for decisions

CAREERS IN MANUFACTURING
____ Planning
____ Manufacturing careers
____ Case studies
____ Career forecasting
____ Marketing yourself

Course Two: Statistical Methods for Manufacturing Quality

INTRODUCTION TO STATISTICS
____ Descriptive statistics
____ Data collection methods
____ Variation
____ Reliability

DESCRIBING DATA
____ Frequency tables
____ Normal distribution
____ Measures of central tendency
____ Quartiles
____ Standard deviation
____ Z scores

DISPLAYING DATA
____ Histograms
____ Stem and leaf plots
____ time series plots
____ Comparing variables

QUALITY TOOLS
____ Cause and effect diagrams
____ Check sheets
____ Histograms
____ Pareto diagrams
____ Scattergrams
____ Flow charts
____ Control charts

THINKING STATISTICALLY (CASE STUDIES)
____ Analyzing the adequacy of data
____ Sources of data
____ Other factors affecting the data
____ Methods of analysis

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BASIC PLASTICS SKILLS
____ Molding machine functions
____ Set-up and run molding machine
____ Molding cycle
____ Plastic materials
____ Assembly operations
____ Measuring parts
____ Identifying common defects
____ Part and mold design

ACADEMIC SKILLS
____ Work study habits
____ Listens and follows directions
____ Makes good use of time
____ Reading technical papers
____ Writing reports
____ Basic statistics

SAFETY AWARENESS
____ Understands potential hazards
____ Follows basic safety rules

INTERPERSONAL SKILLS
____ Making verbal presentations
____ Follows business etiquette
____ Leads and participates in team problem solving
____ Respects diversity
____ Demonstrates initiative
____ Accepts constructive criticism

EMPLOYABILITY SKILLS
____ Target and research companies
____ Prepare a resume and portfolio
____ Complete employment application
____ Complete a job interview
____ Take pre-employment tests
____ Write a thank-you letter

COMPUTER SKILLS
____ Proficient in Word Perfect
____ Proficient in Minitab (statistics)

INSTRUCTOR COMMENTS:

AN ARTICULATION AGREEMENT

BETWEEN

KALAMAZOO VALLEY CONSORTIUM

EDUCATION FOR EMPLOYMENT

AND

KALAMAZOO VALLEY COMMUNITY COLLEGE

JANUARY 1995

INTRODUCTION

This agreement is a renewal and modification of the first secondary-post secondary Articulation Agreement of 1985 between the nine Kalamazoo County public school districts and Kalamazoo Valley Community College. That first agreement covered only the business and office careers programs; the new agreement also includes technical programs. Over the past three years, committees, comprised of high school teachers and KVCC instructors, compared and coordinated high school and college curricula and certified course by course equivalency.

Under this agreement, Kalamazoo Valley Community College will grant credit to students who receive a final grade of B or above in an approved KVC/EFE high school course or courses.

To take advantage of this articulation opportunity a high school student need only complete and submit a KVCC application and transcript request form.

Occupational areas covered under this agreement include:

- Accounting
- Computer Information Systems
- Drafting
- Machine Tool
- Marketing
- Office Information Systems
- Welding
- Theater Tech.
- Law Enforcement
- Hospitality Careers
- Health Occupations
- Auto Mechanics
- Electronics

In order to ensure the ongoing vitality and validity of the agreement, KVC/EFE high school teachers and KVCC instructors will be appointed to an occupational area committee by the EFE Articulation Administrator. The EFE Articulation Administrator will act as chairperson and call meetings as needed. Every attempt will be made to include the appropriate vocational education instructors from each KVC high school and KVCC.

The committees will review any changes in curricula and exit competencies that affect the articulated courses and recommend to the EFE Articulation Administrator any modifications necessary to the list of articulated courses.

Included in this document are the Articles of Agreement and the list of articulated courses.

Kalamazoo Valley Community College
Texas Township Campus
6767 West O Avenue
P. O. Box 4070
Kalamazoo, MI 49009-4070

ARTICULATION TRANSCRIPT REQUEST

Student's Name: ____________________ ____________________ ____________________
Last First Middle

Student's Address: ____

____________________ ____________________ ____________________
City State Zip

Social Security Number: ____

High School: ____

____________________ ____________________
Student Signature Date

Please send a copy of my high school transcript showing successful completion of the following articulated course(s):

Course	**Completed At**

Please attach a copy of this request to the high school record and send it to:

Registrar's Office
Kalamazoo Valley Community College
Texas Township Campus
6767 West O Avenue
P. O. Box 4070
Kalamazoo, MI 49009-4070

Distribution: Records Office, Original
Articulation Administrator, copy

Articles of Articulation Agreement

1. A high school student who successfully completes an approved high school course with a final grade of B or above is eligible to receive credit for the equivalent KVCC course.
2. The student must complete a KVCC application form and submit it to the KVCC Admissions Office.
3. The student must complete a transcript request form and submit it to his or her high school office, for release of CA-60 transcript.
4. The high school's administrator will forward the student's completed transcript to the KVCC Registrar's Office.
5. The KVCC's Articulation Administrator will provide an approved list of KVC/EFE high school course titles and their KVCC equivalent to the KVCC Registrar's Office.
6. The KVCC Registrar's office will notify the high school student of their transcript status.
7. When a student enrolls in a program at KVCC, equivalency credits for articulated courses will become part of the total number of credits required for program completion and will appear on the Kalamazoo Valley Community College transcript
8. No limit on the number of articulation credits will be set; however, the number of KVCC credits granted to any one student will depend on the articulation agreement and the student's chosen program of study. A KVCC counselor will advise students as to the number of credits earned for articulated courses
9. No time limit is imposed on a student to receive KVCC credit. Students are encouraged to enroll at KVCC within one or two years of high school graduation. Because student skills could diminish after a period of time, students who enroll more than two years after high school graduation may be encouraged to repeat certain courses
10. KVCC tuition for articulated courses will be waived. No additional fees will be charged
11. Review of the agreement will be completed yearly by Articulation Administrators. The KVCC Articulation Administrator will convene meetings of the Occupational Education committees at least every two years. The Occupational Education Articulation committee(s) will periodically review each articulated course and recommend necessary changes to the approved list to the KVCC Articulation Administrator.
12. Articulated credit may be granted from the following list of courses. Additional courses may be added to this list with the certification of the appropriate articulation committee and approval of the KVCC's Articulation Administrator.

Kalamazoo Valley Consortium
Education for Employment/
Kalamazoo Valley Community College
Articulation Agreement

Statement of Intent

The purpose of this ARTICULATION AGREEMENT is to provide a mechanism which will enable Kalamazoo Valley Consortium Education for Employment educational programs at the secondary level and post-secondary levels to interface, thereby granting equivalent college credit to students for skills acquired in secondary programs.

DATE: ____________________

POST SECONDARY INSTITUTION	**AUTHORIZED AGENTS**
	Vice President for Academic Services
	____________________ Helen McCauslin Kalamazoo Valley Community College
	Contact Person
	Richard Roder Dean of Business and Technical Studies Kalamazoo Valley Community College
SECONDARY INSTITUTION	
	DIRECTOR
	____________________ Irv Cumming Kalamazoo Valley Intermediate School District

Kalamazoo Valley Community College
Financial Services Office
(616) 372-5292

Authorization for Tuition Assistance
High School Dual Enrollee

Procedures to be followed:

1. High school declares student eligible for dual-enrollment status.
2. This form is completed by student and appropriate high school personnel.
3. Student submits a completed Admissions Application to KVCC.
4. Student schedules orientation and asset testing with the Admissions Office at KVCC.
5. Student registers for class(es).
6. Student submits this form to the Financial Services Office Pay Station at KVCC at the time of registration.

Please Note: Students are responsible for all costs other than the tuition and fees for the courses approved below.

Student Name ______________________ Social Security Number ______________

Semester ______________ Year __________

Eligible Course(s):

Course Title ________________ Course Number __________ Section Number ______

Course Title ________________ Course Number __________ Section Number ______

Course Title ________________ Course Number __________ Section Number ______

Please send an invoice for the total costs of tuition and fees for the courses approved above to:

School District ____

Attention ____

Address ____

The student named above is eligible to participate as a dual-enrolled student as outlined in the State School Aid Act of 1979, as amended by 1993 PA 336, Section 21b. It is agreed that the school district indicated above will reimburse Kalamazoo Valley Community College for the cost of tuition and fees for the course(s) indicated.

This form must be presented at the time of registration each semester and is valid only for the course(s) listed.

Approved By ______________________________ Date ______________
Principal/Counselor's Signature

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Section VI-E:
Student Internships

- Internships are one of the most effective and intensive work-based learning activities of the STW program. They must be carefully planned and executed so that the needs of all the stakeholders -- students, parents, schools, and businesses -- are considered. The student internship is a major commitment for the host business. See Offer Student Internships for the business perspective including costs and pitfalls.

- Internships generally occur during the summer between 11th and 12th grades. They are typically paid work experiences for 6-10 weeks. An Outline for Coordinators from FAMS describes the planning process for schools.

- Crucial to the process is the Training Agreement which outlines what areas the student will work in and what job activities they will actually perform. Depending on the situation, the company may want to have the student work in different departments and participate in company training programs. The idea is that a significant part of the internship should be **learning as well as working**. In others words, the internship should not be just a "summer job", although the company will certainly expect a productive contribution from the student. A good example of a training agreement is the one used by Berrien County.

- The student should keep and **time and training log** for the entire internship. This helps keep them accountable and will enable them to write a self-evaluation and the end. The example included is from a second year TEAM Plastics student, Tyler Zimmerman, who interned at Triple S Plastics. The host company will also provide an evaluation which gives the student useful feedback and can be used by the teacher to assess the learning areas.

- What about **safety and legal**? This issue is specifically addressed by the Plastics Roundtable. The answer is that a student who is not 18 years old *can* work in a plastics processing facility and *can* operate production equipment. Of course there are some guidelines and restrictions. An Executive Summary which outlines the details has been prepared and included here.

Offer Student Internships

Purpose

Companies often develop student internship programs in response to anticipated hiring needs. Program development might begin in the Human Resources Department in line with workforce training, selection and recruitment strategies. Focusing on future workforce needs will provide the greatest return for the company, as well as for student interns. With a well-designed internship program, companies can avoid the higher costs of training entering employees. And interns who are equipped with the specific skills needed by the company are more likely to be hired. Internship models vary, but most programs rely on a sequence of study that reinforces applied academic skills and provides students with increasingly specialized work-based training.

Process

Before developing an internship proposal, the appropriate company department or committee should identify the skills needed by the future workforce. Be sure to include foundation skills such as: basic and communication skills, teamwork, problem solving, etc., as well as job specific skills. Needed skills will drive the curriculum design. Then:

- Develop a preliminary program proposal.
- Provide a rationale for the program as a cost effective way to address future training needs. Conduct a cost analysis of current training costs, if feasible.
- Develop a draft budget, based on your cost data. To do this, you must decide if student interns will be paid or unpaid. Program models vary, but typically summer student interns are paid a stipend. School year interns, particularly if they intern during school hours as part of their academic program, may be unpaid.
- Enlist the support of high level executives.
- Review proposal with corporate legal, compensation, human resources, and labor representatives.
- Present the proposal.

After the proposal is reviewed and approved, begin developing the program. This will need to be done in partnership with the Tech Prep consortium or identified Tech Prep program. Some considerations:

- Determine the target student population. Look at other models, including the Boeing model, and discuss how to target with your Tech Prep consortium. Internships for Tech Prep students might be most beneficial after students have taken some Tech Prep courses, i.e. during the last two years of high school. Decide if you would like to do additional targeting, such as female or minority students, students who do not plan to attend four-year college, students who have at least a 2.5 GPA, etc.
- Determine the program's time frame and duration. These are in part a function of your budget, the skills you want to teach, and the ages and skill levels of the students. Options include: summer six weeks/over one-three summers, Saturdays, during or after school/over one-three years, etc.

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(Student Internships, cont.)

- Develop curriculum based on identified skill needs. Work with the Tech Prep program and review existing company training resources for appropriate modules. Identify desired competencies, including technical and academic skills, and a chart that demonstrates competency sequence over time.
- Determine through what formats identified skills will be build. These may include: onsite training, classes, student projects, rotations with various employee mentors, etc.
- If your internship model includes employee mentors, identify and recruit them. Determine the parameters of their commitment. Develop rotation schedules if students rotate between departments or mentors.
- Identify supporting resources required. These include: equipment and materials, instructional and supervisory personnel and equipment, coordination time and administrative processes. Since instructor time takes personnel away from work tasks, schedule instructors as soon as curriculum sequence is developed.
- Work with your consortium and school contacts to identify, recruit, pre-screen and select a pool of student applicants.
- Because internship is a major commitment of company and student time, and may involve pay, make sure to conduct a full interview of candidates. This also provides important practice for the students.
- After interns have been selected, hold an orientation to the program. Cover routine issues that you would with any new employee (rules, dress, regulatory requirements, parking, attendance, etc.). Answer questions regarding the project, and invite company advocates.
- During the internship program, provide regular forums for all participants to provide feedback and have problems resolved.
- After the first group of internships ends, evaluate the program, both internally and with students and educator partners. Make revisions based on evaluation. Celebrate the achievements of students.
- Develop a follow-up process to determine how many intern graduates are ultimately hired by the company, and the cost benefits reaped.

Payoff

- The company benefits from directly training potential employees with reduced costs. The result is a better prepared workforce.
- Students build applied academic and technical skills in real workplace contexts. Using company equipment and learning from company instructors, they come to understand what the workplace requires and the nature of manufacturing environments. The result is a more motivated workforce with realistic expectations regarding work.
- Internship programs strengthen Tech Prep partnerships. When combined with teacher internships, student internships help companies shape educational programs and workforce development.
- Company employees benefit from mentoring and teaching what they know.

Pitfalls

- A successful internship program is a major commitment of time and resources. It is better not to embark upon this activity without excellent support at all levels of the company. If interns are paid it is especially important to resolve all labor and liability issues.
- Excellent planning and coordination is crucial, as well as ongoing communication with educator staff.
- Make sure to develop good student screening and interview procedures. Each intern represents a substantial commitment of company resources.

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(Student Internships, cont.)

- Don't forget to use follow-up information to help evaluate program success. It is important to know if interns are ultimately hired by the company.
- Make sure interns know that the internship is not a guarantee of future employment.

Costs

- Personnel planning and coordination time.
- Costs of curriculum development, equipment, other materials.
- Potential loss of employee mentor productivity.
- Time for coordination with school personnel, student meetings, etc.
- Wages for students, if paid.

OUTLINE FOR COORDINATOR

1. Locate potential businesses
    - develop Business Advisory Council (BAC)
    - check out library
    - check with Chamber of Commerce
    - check with other professional business organizations
    - word of mouth (your friends)

2. Convince companies to take on interns
    - handouts
    - call/visit
    - info about FAMS
    - resumes with skills list of FAMS students
    - testimonials from previous successful intern sites

2a. Define internship at company
    - figure out what the intern will be doing
    - how long/how many hours/how much $
    - skills required for the job
    - dress code
    - define liability responsibility

3. Get students ready
    - develop resume and interviewing skills by the teacher
    - parents meeting
    - fill out the copies of the forms
    - match students with jobs already available
    - define summer activities
    - transportation issues

4. Send resumes to companies

5. Company decides which applicants to interview
    - make appointment for interview

6. Interview takes place

7. Paperwork must be filled out

8. Start Internship

9. Have students maintain a Daily Journal and Weekly Executive Summary of experience/take pictures

10. Check in with the students and the supervisor at intervals

11. Evaluate internship
    - from the student and the company
    - testimonial from the company about the student
    - letter of recommendation from the company to the student

12. Show gratitude to employers by holding an appreciation event
    - breakfast, luncheon, or evening show
    - include a certificate or plaque for the employers

Berrien County
Intermediate
School District

School-To-Work

Training Agreement

Work Based Education Programs

For School-To-Work Coordinator Use Only

_____ Apprenticeship
_____ Job Placement
_____ Work Experience
_____ Cooperative Education
_____ Job Shadowing
_____ Work Study
_____ Internship
_____ Mentorship
_____

School District ______________________
School Building ______________________
Address ______________________
Phone ____________ Fax ____________

In Cooperation With

Employer ______________________
Training Supervisor ______________________
Address ______________________
City ____________ State ____ Zip ____________
Phone ______________________
Fax ______________________
Job Title ______________________
Worker's Compensation ☐ Yes ☐ No

Student ______________________
Address ______________________
____
Phone ______________________
Social Security No. ______________________
Grade ____________ Age ________ Sex M F
Birthdate ______________________
Rate of Pay ________ Deviation ☐ Yes ☐ No
Daily Time Schedule: ______________________
Hours Work Per Week ______________________
Eligible Credit Hours ______________________
Date Employment Begins ______________________
Expected Completion Date ______________________

Job Tasks and Activities
The student will receive training from the employer (on the job) for the following work related tasks and activities (see attached training plan):

Related Instruction
____
____
____

Some Responsibilities of Program Participants:

1. Trainee will abide by the regulations and policies of his employer and the school.
2. The employer assumes the responsibility of providing the trainee with the broadest occupational experience in keeping with job activities listed above.
3. The School-To-Work coordinator will arrange for in-school related instruction, consultation and advisory service to parties concerned with this training program.
4. The employment of the trainee shall conform to all federal, state, and local laws and regulations, including nondiscrimination against any applicant or employee because of race, color, religion, national origin or ancestry, age, sex, marital status or disability.

Please sign below on appropriate line

______________________ Student Signature Date
______________________ Parent Signature Date
______________________ Employer/Supervisor Signature Date
______________________ School-To-Work Coordinator Signature Date

This Training Agreement shall not be interrupted without prior consultation between trainee, employer, and coordinator.

It is the policy of this school that no person on the basis of race, color, religion, national origin, age, sex, height, weight, marital status or disability shall be discriminated against, excluded from participation in, denied the benefits of or otherwise be subjected to discrimination in employment or in any program or activity to which it is responsible or for which it receives financial assistance from the U.S. Department of Education. Inquiries related to section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of disability, should be directed to the Section 504 Administrator.

COPY DISTRIBUTION: WHITE - Employer YELLOW - School PINK - Student

[illegible]STWTRAIN.NEW ● February 5, 1996

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Berrien County
Intermediate
School District

School-To-Work

Training Plan

School District ____________ School Building ________ School Year ________

Employer ____________ Address ____________

For School-To-Work Coordinator Use Only

____	Apprenticeship	____	Cooperative Education	____	Internship
____	Job Placement	____	Job Shadowing	____	Mentorship
____	Work Experience	____	Work Study		

Student ____________ Phone ________

Student Job Title ____________ Phone ________

Training Supervisor ____________ Phone/FAX/Ext. ________

Job Tasks/Training Activities	Related Instruction

Student Signature ____________ **Date** ________

Supervisor Signature ____________ **Date** ________

School-To-Work Coordinator ____________ **Date** ________

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INSTRUCT CTE PRESENT APAGAPLN December 1, 1995

Triple S Plastics

1 week-Machine Operator
1 week-Mold setup training in Tech Centre
1 week-Machine Operator
2 weeks-Assembly
2 weeks-Quality Assurance
1 week-Tool Room
1 week-Satellite Mold Design
1 week-Machine Operator
1 week-(1/2 at Satellite EDM/CNC, 1/2 as Machine Operator

Schedule

Machine Operator-7:00 am-3:00 pm (Breaks at 9:00 am, 20 min. lunch at 11:00 am, and break at 1:00 pm)
Assembly-7:00 am-3:30 pm (1/2 hour lunch at 11:30 am, breaks at 9:20 am and 1:50 pm)
Quality-6:30 am-3:00 pm or 7:00 am-3:30 pm (1/2 hour lunch and breaks at preference)
Satellite CAD-8:00-4:30 with 1/2 hour lunch

Tyler Zimmerman

The summer of '96

I worked full time at Triple S Plastics in Vicksburg, MI from June 10 - August 23, 1996. Triple S manufactures various products made from plastic. Those products include: Bose CD player components, dash board parts for Lowell, cell phones for Motorola, computer parts for IBM, camera parts for Kodak, and medical products, like bed rails and wheels, for Stryker.

Typically, I would come to work a few minutes before seven o'clock a.m. and work until three o'clock p.m. Machine Operators get breaks at 9 a.m., 11 a.m. (20 minute lunch), and 1 p.m. Departments such as Assembly, Quality, Tool Room, and the Tech Centre receive 30 minute lunches, but they are unpaid.

During my intern, I observed over 15 different careers. Those careers included: **machine operator, utility, motan, shipping/receiving, mold setup, process technician, assembly, engineering, sales representative, tool repairman, quality inspector, quality technician/engineer, CNC/EDM programmer, mold design(CAD), and moldmaker.**

While there are those who decided to get a degree in a specific field, I was surprised at the number of people who worked hard to get where they are. For example, the majority of people in production put in several years of seniority to reach supervisor,etc. In quality, many people were inspectors and attended seminars and/or continuing education classes at KVCC to advance themselves. This was especially true at the CAD dept. at Satellite Mold, where only one guy had a degree in drafting. A couple were mold makers prior to CAD, and had never taken a college class. One was a high school drop out, another was a college drop out, but they never quit learning. They told me about one guy who used to work for Satellite as a mold designer. He graduated from Mattawan High School, and worked for a Industrial Lawn Mowing Company. He had taken a drafting class in high school, and was in to computers. He was hired into Satellite as part-time, initially, and eventually worked his way into a full time position. WOW! That man has my respect and full admiration.

The most important skills learned from Courses 1 and 2 were the Quality Tools, Control Charts, Standard Deviation formulas, and MiniTab software. They were tremendously useful in Quality Assurance.

Triple S used a robotic arm on one machine, making the Motorola Cellular Phones, to take it out of the press and set it on a conveyor belt, sending it to a person who would ultrasonically weld a brass nut into the antenna area.

My eyes were really opened during my internship. Not only was I introduced to working a full eight hour day, I was able to witness, firsthand, the HUGE amount of opportunity in the Plastics Industry. If people would just have the proper attitude, show up on time, and commit themselves to performing their best, American companies wouldn't have an excuse to move away or downsize. I also had some processes in the industry explained so well that I finally understood them. Finally, I was able to meet new people, learn some very rewarding things, and look into pursuing some careers that I never even knew existed. Working hard and continuing your education go hand in hand. You can accomplish anything if you really put your heart and mind to it. There are many roads to various careers in the plastics industry.

The people were very friendly and some other privileges that Triple S allowed were: You could drink pop in plastic bottles on the job, having a radio or fan at your machine, and allowing you to wear shorts.

Oh, by the way, the pay isn't too bad, either.

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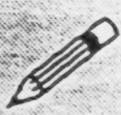
THE EXPERIENCE EXCHANGE



EMPLOYER EVALUATION - INTERNSHIP

21

TO BE COMPLETED BY THE WORK SITE SUPERVISOR.

STUDENT: ______________________________

COMPANY: ______________________________

PLACEMENT ASSIGNMENT: ______________________________

SUPERVISOR: ______________________________

PERFORMANCE CATEGORY

❶ Needs improvement ❷ Satisfactory ❸ Excellent

	❶	❷	❸
ATTENDANCE/PUNCTUALITY			
Attendance			
Punctuality			

	❶	❷	❸
WORK PERFORMANCE			
Completion of routine tasks			
Completion of non-routine tasks			
Initiative in seeking new responsibilities			
Demonstrates appropriate knowledge of academic skills needed			
Ability to communicate effectively			
Ability to follow instructions			
Ability to organize task and time			
Ability to solve problems			

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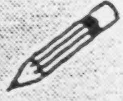
TO BE FILLED OUT BY:
- ☑ Employer
- ☐ School
- ☐ Parent
- ☐ Student
- ☐ The Experience Exchange

RETURN TO:
- ☐ Employer
- ☑ School
- ☐ Parent
- ☐ Student
- ☐ The Experience Exchange

COPY TO:
- ☐ Employer
- ☐ School
- ☑ Parent
- ☑ Student
- ☐ The Experience Exchange

Continued . . .

THE EXPERIENCE EXCHANGE



EMPLOYER EVALUATION - INTERNSHIP

🗎 21

	❶	❷	❸
WORK PLACE CONDUCT			
Courtesy and professionalism			
Dress and grooming			
Respect for property and equipment			
Observance of work place regulations			

ATTITUDE			
Eagerness to work/learn			
Ability to work with others			
Poise and self-confidence			
Ability to accept responsibility			
Ability to accept and respond to criticism			

OVER ALL PERFORMANCE RATING			

GENERAL COMMENTS: ______________________________

____

____

____

SUGGESTIONS FOR IMPROVEMENTS: ______________________

____

____

____

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Work-Based Learning and the Fair Labor Standards Act: Legal and Safety Issues of Employing Students in Plastics

An Executive Summary Prepared for the MPIR
by Rick Zinser

With the passage of the School-to-Work Opportunities Act in 1994, questions have arisen concerning whether a student's work-based learning experience is covered under the Fair Labor Standards Act (FLSA). Since FLSA specifies particular limits on the employment of minors the answer is "yes" although some definitions need to be clarified for employers. The following points apply to 16 and 17 year olds in non-farm labor.

1. Not all STW activities conducted at employers' worksites are subject to FLSA because they are not considered *employment*, e.g. field trips and job shadowing.

2. A work-based learning experience is not considered employment when all of the following criteria are met:

    a. any productive work by the student would be offset by the training cost to the employer
    b. the placement of a student at the worksite does not displace a regular employee
    c. the student is not entitled to a job at the completion of the experience
    d. the student is not entitled to wages except for a stipend to cover expenses

3. A student is considered an employee when they participate in a summer internship or co-op work experience through a recognized STW program. The internship is generally held for at least 20 hours per week for at least 6 weeks. Co-op work is conducted during the school year, generally after school on week days. The areas covered by FLSA are:

    a. the student must have a work permit and training agreement
    b. the student must be paid at least the Federal minimum wage
    c. the student must be paid time-and-a-half for overtime
    d. the employer must comply with the restrictions of child labor laws.

4. There is a list of 17 hazardous occupations that minors are not allowed to work in, such as coal mines and meat processing. Prohibited occupations that apply to plastics manufacturing are the use of forklifts and cranes. Restricted occupations include the operation of "power-driven forming machines" (i.e. molding machines and most assembly equipment). A student learner may operate these machines if they are employed under a training agreement signed by the employer and school placement coordinator, provided that employers comply with the following recstrictions:

    a. all hazardous work must be performed under direct supervision
    b. safety instructions must be given by the school and reinforced by the employer with on-the-job training
    c. the training follows a schedule of organized and progressive skill development

   d. the machines comply with the normal MIOSHA safety requirements.

5. Minors may not drive on the job, even in STW situations, except if the driving is "occasional and incidental" which means driving is limited to no more than 20% of the minor's work in any workday and does not exceed 5% in any workweek. Minors may not operate forklift trucks (typically used for material handling), or overhead cranes (typically used for setting molds) even is STW situations.

6. Students officially employed in recognized STW programs are generally covered under the employers' workers compensation insurance. Students who visit a company but who are not employees are generally covered under their parents' insurance, or in some cases under their schools' insurance.

7. It is recommended that schools and companies jointly develop a risk management plan for student workers and visitors.

For additional information contact:

Valorie Putnam, Michigan Department of Education, 517-335-0381
Lorraine Smith, U.S. Department of Labor, 313-226-7448

Also, read the attached reports:

STW Opportunities and the FLSA
Guide to Work-Based Learning
FACT SHEET: Work Permits in Michigan
FACT SHEET: Federal Guide for Employing Teenagers

Plastics STW Components and Tools

Section VI-F:
Apprenticeships

- Apprenticeship is a relatively new concept for the plastics industry, except for mold makers. Basically, a training program is established which identifies the kinds of work experience and course work which enables the participant to be certified as a Journey Person. An apprenticeship program could be developed for virtually any profession, but only a few are sanctioned by the Bureau of Apprenticeship. Kalamazoo for example has a Work Force Entry program, for a variety of students and professions, which may or may not be part of an official apprenticeship. An example for the plastics industry is the **certified molder** program which combines work, on the job training, and college courses. See the enclosed Pay for Knowledge and Skill Program.

- Blue Water Plastics in Marysville has two authorized apprenticeship programs: Plastic Process Technician and Plastics Maintenance Technician. The attached lists show the number of hours and kinds of experience and course work that is required.

- To emphasize the increasing importance of apprenticeship programs the Michigan Jobs Commission has just introduced the Youth Registered Apprenticeship Tax Credit to help businesses offset some of the cost of employing student workers. This is a positive step that plastics companies should take advantage of.

- The same **safety and legal** considerations for internships apply to apprenticeships.

WHAT IS AN APPRENTICESHIP?

APPRENTICESHIP IS A TRAINING PROGRAM THAT WORKS!

During the apprenticeship period (1-5 years, depending upon the occupation), the student combines on-the-job training at the company with related classroom instruction at the high school. Upon graduation from high school, courses are continued at Kalamazoo Valley Community College.

WORK FORCE ENTRY APPRENTICESHIP PROGRAM

The Workforce Entry Apprenticeship Program allows qualified high school students to gain an early and supervised entry into one of over 825 occupations approved for apprenticeship by the Department of Labor. Workforce Entry coordinators work with qualified students and employers to establish the apprenticeship training program. Each employer and apprentice is then registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training.

Apprenticeship opportunities are based on local business and industry needs. Apprenticeships are commonly avaliable in, but not limited to, the following EFE programs:

- AgriScience
- Auto Body
- Auto Mechanics
- Construction Trades
- Electro-Mechanical Technology
- Graphic Arts
- Health Occupations
- Machine Tool
- Manufacturing Cluster
- T.E.A.M. Plastics
- Welding

Benefits To The Employer

- A pool of ready apprenticeship trainees
- A ready workforce in traditional and non-traditional areas
- Training programs to meet the needs of each industry
- Recognition for cooperative training program participation
- A direct link between education and business
- Federal certification as an employment training site

Benefits To The Students

- A trial experience which will help them decide if apprenticeship is for them
- A potential for full time, skilled employment
- Hours worked are accredited toward the apprenticeship requirement
- Vocational/Technical Education courses completed at the high school may be articulated (credited) at Kalamazoo Valley Community College
- Career Planning Assistance
- Placement Services

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How Do Students Enroll in the Program?

SEE YOUR COUNSELOR TO ENROLL IN A KCC/EFE CLASS

CONTACT MADE WITH WORKFORCE ENTRY COORDINATOR

COMPLETE APPRENTICESHIP APPLICATION AND INTERVIEW

EMPLOYER SELECTION OF APPLICANT

FORMAL APPRENTICESHIP AGREEMENT WITH EMPLOYER

FULL-TIME APPRENTICESHIP UPON GRADUATION FROM H.S.

POST-SECONDARY RELATED INSTRUCTION

RECEIVE CERTIFICATE FROM THE DEPARTMENT OF LABOR UPON SUCCESSFUL COMPLETION OF REQUIREMENTS

ABC Plastics Company
Kalamazoo, MI

Pay for Knowledge and Skill Program

	Wage Scale for Molders	College Courses	In-House Training
Starting wage	$6.30 per hour		
3 Months	7.10		Paulsen 1-15
1 Year	8.50	2 courses complete	4 wks in Production
2 Years	9.00	4	2 wks in Toolroom
3 Years	9.50	6	2 wks in Maintenance
4 Years	10.15	8	

All molders are required to complete the following list of courses from Kalamazoo Valley Community College:

MSM 102	Basics of Mechanical Technology
PLA 100	Introduction to Plastics
MTH 149	Math
ENG 098	English
PLA 115	Injection Molding
PLA 250	Introduction to Quality Control for Plastics

Plus 2 electives from:

MEC 103	Fundamentals of Machine Tool
ELT 100	Introduction to Electricity
MSM 100	Basic Fluid Power
PLA 215	Plastics Extrusion
PLA 135	Introduction to Poly Materials

Molders will not advance to the next pay level until training and coursework for that level are finished satisfactorily. Upon completion of the in-house training, the 8 college courses, and 8000 work hours each Molder will be awarded a Molder Certificate. Absences from training may not exceed two per year. College courses require a C grade or better to be reimbursed and counted toward requirements.

If a Molder chooses to take 4 courses per year instead of the minimum 2, they could achieve an Associates Degree after 4 years and then be eligible for promotion to Set-up Technician, Quality Technician, or Skilled Trades. These positions generally pay $12.00 to $15.00 per hour.

BLUE WATER PLASTICS
PLASTIC MAINTENANCE TECHNICIAN
APPRENTICE PROGRAM

PROGRAM PURPOSE AND INTENT:

The Maintenance Technician Apprentice Program has been designed to provide selected Blue Water Plastics' employees with sufficient technical background, knowledge, and skill to properly and safely maintain plant and equipment. The program provides an opportunity for employees to obtain a certificate, upon completion, from the Department of Labor - Bureau of Apprenticeship and Training. It also provides for continuing educational opportunities for skilled personnel to keep them abreast of the latest developments in process and equipment pertaining to maintenance.

METHOD OF SELECTION:

1. Analysis of specific need at each plant.

2. Post notices for application to program

3. Human Resources review applications based on the following criteria:

    a) Education-must be a high school graduate or possess GED, must take Math and English entrance exam at St. Clair Community College prior to consideration for the program.

    b) Service-Must be considered a full-time, regular employee.

    c) Physical Ability-Must be able to perform the necessary physical demands as required by the position of Maintenance Person.

    d) Work Record-Must have good general work record, safety, and attendance.

    e) Attitude-Must have a desire to learn, and must acknowledge in writing his/her willingness to complete the requirements of the program.

4. Candidates will be interviewed by Human Resources, who will then make recommendations for new apprentices. All selected candidates must also be approved by plant management.

APPRENTICE ADVISORY COMMITTEE:

The Advisory Committee will serve as an advisory body on such matters as observation of prog made, decisions during the trainee's probationary period, revisions to course outlines, and in general foster trainees by guiding and helping them through the program.

REVIEW AND EVALUATION:

All apprentices will be evaluated every six months. The first occurring in January based on the previous fall semester and in June, following the spring semester. At this time the work hours completed as well as courses completed will be reviewed and will relate to the amount of wage increase granted.

WAGE SCALE: (for an entry level apprentice)

Starting Rate = $7.50

Wage increases are based on percentage completion of the program and on the job performance. All proposed wage increases are subject to approval of the General Manager.

GENERAL PROGRAM PROVISIONS:

1. Blue Water Plastics, Inc. will pay for all tuition, lab fees, and textbooks required. In the event that a course is not completed with a grade of "C" or better, the apprentice will be required to reimburse the Company for all fees. The apprentice will be allowed to retake the course once (at the Company's expense). If a course is not successfully completed within two semesters, the apprentice will be released from the program. If the employee drops a course after the SC4 accepted "withdrawal period", the employee will be required to reimburse the Company for all fees paid; including books, materials, and tuition.
2. Any employee who leaves the employ of the Company within one year from completion of individual course(s) qualifying for tuition reimbursement will be required to reimburse the Company the amount of all fees paid; including books, materials, and tuition.
3. Upon satisfactory completion of school and work experience, a certificate designating that the apprentice has completed the program will be issued by the Bureau of Apprenticeship and Training, U.S. Department of Labor.

WORK HOUR REQUIREMENTS:

Work Process	Number of Hours
Operation of basic machine tool equipment	400
A.C. Motors, Controllers, Installing A.C. Motors, Commercial Wiring	700
Preventative Maintenance-Machine repair and servicing	1400
Troubleshooting-Electrical	2000
Electrical Circuit Diagrams	500
Troubleshooting-Hydraulics & Pneumatics	1500
Hydraulic Circuit Diagrams	500
Steel fabrication, miscellaneous iron and welding	500
Repairing and rebuilding pumps, relief valves, bench, two and four-way valves, check valves, etc.	500
TOTAL	8000

COURSE REQUIREMENTS:

		Contact Hours
Basic Algebra	MTH102	80
Hydraulics/Pneumatics	IA 143	96
Residential Wiring	ELT 105	96
Industrial Electricity	IA 100	96
Programmable Logic Controllers	IA 102	96
Robotics	IA 101	80
Welding	WELD 110 ABC	96
Blueprint Reading	MFT114	48
Basic Machine Tool	MFT111	96
Elective		96

880 Total Contact Hours

BLUE WATER PLASTICS, INC.
JOB DESCRIPTION

DEPARTMENT: MANUFACTURING
JOB TITLE: PROCESS TECHNICIAN
JOB CODE: 6300
REPORTS TO: PLANT MANAGER

GENERAL JOB DESCRIPTION:

Oversees all processes involved in the manufacture of plastic injection molded products such that improvements in the areas of productivity, cost reduction, scrap reduction, mold try-out, and training are achieved.

ESSENTIAL JOB FUNCTIONS:

1. Checks all machines daily for correct molding parameters.
2. Directly responsible for process sheets and cycle cards.
3. Studies methods of processing all jobs; troubleshoots.
4. Monitors scrap rates and develops, recommends and implements corrective action to improve scrap efficiencies.
5. Coordinates and maintains tool repair reports and is involved in minor repair.
6. Responsible for setting dies.
7. Coordinates with engineers in sampling new tools.
8. Involved in production control, end of run meetings, and quality planning.

SUPPLEMENTAL JOB FUNCTIONS:

1. Other duties as assigned.
2. Participation in all continuous improvement programs.

MINIMUM EDUCATION, SKILLS AND EXPERIENCE:

Completion of Apprenticeship Program and attainment of Certificate.

PHYSICAL ABILITIES REQUIRED:

1. Physical activities include broad range of troubleshooting/repair of all machinery
2. Mobility in plant.
3. Ability to lift at least 50 lbs.
4. Visual and hearing ability with or without correction.
5. Communication abilities.

WORK ENVIRONMENT:

1. Inside, plant environment
2. Clean
3. Well lighted
4. Well ventilated
5. Noise level below industrial health standard

APPROVALS:

GENERAL MANAGER____DATE________

SUPERVISOR ____DATE________

EMPLOYEE____DATE__________

Revised 7/26/92

RELATED INSTRUCTION
Apprenticeship Program
Plastic Process Technician

	Course	Course #	College Credit	Contact Hours	Completed
1.	Plastic Process Applied Mathematics	(Customized for BWP)	0	37 1/2	
2.	Basic Electricity and Residential Wiring	ELT 105	3	96	
	or Fundamentals of Electronics	ELT 130	4	112	
3.	Industrial Electricity	ELT 106	3	96	
4.	Advanced Industrial Electricity	ELT 107	3	96	
5.	Basic Hydraulic Components and Circuits	FLP 141	3	80	
6.	Pneumatic Components and Circuits	FLP 142	3	80	
7.	Blueprint Fundamentals	MFT 114	2	48	
8.	Statistical Process Control	QA 117	2	48	
9.	Robotics Theory and Operation	RBT 101	3	80	
10.	Introduction to Plastics	PLT 120	4	96	
11.	Plastics Manufacturing Processes	PLT 121	4	96	
12.	Introduction of Injection Molds	PLT 220	4	96	
13.	Physical Properties/ Testing	PLT 122	4	96	
		Total		1045.5/1061.5	

Company ______________________________

Apprentice ______________________________

WORK HOUR REQUIREMENTS:

Work Process	Number of Hours
Cycle Records	500
Production Control	100
Product Development Teams	200
Mold Tryouts	2000
Material Sampling	500
Scrap Reduction	600
End of Run Evaluations	500
Set Dies	500
Minor Tool Repair	500
Electric and Solid State	500
Hydraulic Applications	200
Secondary Equipment	300
Pneumatic Applications	200
Quality Planning	400
Troubleshooting	1000
TOTAL	8000

Youth Registered Apprenticeship Tax Credit

Purpose:

A tax credit of up to $2000 annually per apprentice is being proposed for employers, who through registered apprenticeships, train young people while they are still in high school.

Background:

The Jobs Commission believes that Michigan currently leads the nation in the number of high school students in registered apprenticeship programs, current figures range between 100-200 young people annually in registered apprenticeships. However we must find a way to greatly expand the number if we are going to make an impact on the 1.6 million students in school today.

One of the major issues for employers engaged in the School-to-Apprenticeship discussion is the cost of training young people at the worksite, including the wages, cost of supervisors or other employees engaged in training the student and the use of equipment that could otherwise be creating a product.

Employers, especially small employers, seem supportive of an incentive to participate in the School-to-Apprenticeship programs.

Definitions:

Registered Apprenticeship: Training programs operated by employers, employer associations or jointly by management and labor, designed to provide workers entering the workforce with comprehensive training by exposing them to the practical and theoretical aspects of work required by the occupational area. Those programs registered by the Bureau of Apprenticeship and Training, U.S. Department of Labor have the following nine components:

1. Sponsored by employers and others that have the ability to hire and train in a work environment.
2. Needs of business and industry dictate content and length of training.
3. Has specific legal status and is regulated by state and federal laws/rules.
4. Leads to formal, official credentials (certification of completion and official journey person status).
5. Involves significant investment of time and money from employers or other sponsor.
6. Provides wages to apprentices during training according to a predefined wage progression scale.
7. Participants learn by working directly under supervision of masters in the craft, trade or occupation and attend a specified amount of classroom-related instruction.
8. Written agreements detail the roles and responsibilities of the sponsor and the apprentice. Implicit expectations include the right of the sponsor to employ the apprentice, and the right of the apprentices to expect employment.
9. Apprentices earn a Certificate of Completion that documents the achievement of industry-defined skills at industry-accepted standards.

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School-to-Apprenticeship: An employer, employer association, or the employer and the union establish programs that allow high school students to participate in registered apprenticeship programs while completing their requirements for graduation. Students are employed part-time with structured on-the-job training being combined with classroom work. Wages are paid on a graduated scale leading to journey status. Continued employment with the firm is expected. A formal agreement is made between the business or industry, the educational facility and the U.S. Bureau of Apprenticeship and Training.

Who Is Eligible?

The tax credit is for employers who train registered apprentices while they are still in high school, prior to attaining a high school diploma or age 19, whichever comes first.

Tax Credit Covers

The youth registered apprenticeship tax credit is up to $2000 annually per apprenticeship, and applies to the single business tax.

The tax credit would cover 50% of the wage-related costs of the youth apprentice including salary, fringes and other payroll expenses of the apprentice.

The tax credit would also cover up to 100% of the costs of classroom related instruction paid by the employer. These costs could include college level courses (tuition, fees and books) taken by the student while still in high school. The apprenticeship agreement signed by the employer and the student identifies when the employer is responsible for the classroom related costs.

Other Provisions

School-to-Apprenticeship programs established locally must be filed with the local Workforce Development Boards as part of their responsibility to ensure the workforce needs of employers in their area are met. These local boards will report quarterly to the Michigan Jobs Commission on the number of School-to-Apprenticeships filed with them.

There will be a three year sunset provision on the legislation in order to evaluate the cost and usefulness of the tax credit.

Section VI-G:
Evaluation

* As the accompanying article explains, evaluating school-to-work programs is crucial for improvement and success. See Evaluation for School-to-Work Systems Improvement. It is often difficult to obtain adequate information: students, parents, and businesses may be reluctant to fill out surveys. Yet formal evaluation is important for advisory committees to know what is working and what needs to be changed.

* An organization called Mathematica Policy Research is conducting a **national survey**. See the Local Partnership Survey cover page to contact them.

* The Upjohn Institute for Employment Research conducted a survey of former students and their parents in Kalamazoo County's Education for Employment program for the 95-96 school year.

Evaluation for School-to-Work Systems Improvement

The foundation of continual systems improvement is evaluation, a basic management tool integral to the cycle of system design, implementation, and improvement. At its best, evaluation offers compass readings that enable the managers of a system to navigate, continually adjusting course towards their basic objectives. Some evaluations assess how well or how poorly systems operate (*process* or *formative* evaluations). Other evaluations examine how effectively systems achieve their intended results (*outcome, summative*, or *impact* evaluations).

The well-designed evaluation builds into the management cycle the capacity for self-reflection and improvement. Just as individuals reflect upon and learn from their experiences, systems that rely on evaluation as a management tool incorporate the lessons of experience into subsequent planning. This approach views evaluation neither as an ad hoc nor as a one-time-only undertaking, but as a step in the management cycle.

Building effective school-to-work systems is precisely the kind of complex systemic change that cannot be accomplished without evaluation. Increasingly, school-to-work systems are conducting self-evaluations or hiring evaluation teams. Evaluations of complex systems, such as the school-to-work system, usually incorporate both process and outcome evaluations. Process evaluations of school-to-work examine issues related to the design and implementation of the system's model. Outcome evaluations look at how effectively the system is achieving its purposes, both for students and for the local schools, employers, and community. It enables management ultimately to assess the impact of the system on their students, specifically how their students perform in school and mature developmentally, and how their graduates fare in the worlds of work and postsecondary education.

Marketing is a secondary but important use of the information generated by evaluation. Studies that demonstrate a system's effectiveness in achieving results help justify the system and increase its visibility with the public and important constituencies--policy makers, employers, parents, funders, students, school boards, administrators, and teachers--persuading them to support the work underway, even leveraging additional resources. Evidence of effectiveness also has internal value in that it affirms for the system's leadership and staff the importance of their work.

Designing an evaluation of a school-to-work system requires a series of steps:

Identify Stakeholders. The first step in designing an evaluation is to assemble an evaluation team consisting of representatives of the primary stakeholders in the school-to-work system--including managers, instructors, partners, students, and funders--as well as the staff members with immediate responsibility for seeing that an evaluation is conducted. The team's knowledge of the system contributes in crucial ways to the design of the evaluation and the framing of questions. Involving stakeholders from the beginning engages them in the evaluation process, a step likely to improve their understanding and their ownership of its findings, increasing their willingness to act upon them. Their involvement also helps evaluators gain access to people and other information sources.

Define the Evaluation's Purposes. The evaluation team next discusses and defines the evaluation's purposes. Is it to examine process or impact or both? They identify the primary consumers of the information to be gathered through the assessment, and the decisions to be made on the basis of that information. Answers to these questions about overall purpose, as well as the system's clarified goals and objectives, shape the evaluation design.

Clarify Goals and Objectives. The next step in conducting an evaluation is to clarify goals and objectives. Goals are abstract, idealized statements of desired outcomes. Objectives are these goals restated in operational form, spelling out in detail one or more measurable criteria for success. The well-stated objective is specific, relevant, measurable, and attainable. Goals and objectives provide the standard for assessing the effectiveness of the system and its impact.

Determine Evaluation Roles and Hire an Evaluator. Whether to hire an internal or external evaluator depends on several factors, including cost, evaluation expertise, commitment, accessibility, and bias. An internal evaluator may bring a deep commitment to and understanding of the system, but may also be less objective and more resistant to recommendations for change. Expertise may also be an issue, since few organizations have evaluation specialists on staff.

The most complex, sophisticated evaluation studies--besides costing more in time and money--do not necessarily produce the most useful findings, however. And simpler evaluation methods do not require experts. Managers of school-to-work systems may wish to conduct some evaluations using their own staff and to hire outside experts for specific, more difficult evaluation tasks.

Write Measurable Evaluation Questions. The evaluation team should brainstorm the questions to which they would like answers. The team should narrow these down by eliminating those that cannot be answered by available or obtainable data. The final list of questions should be cast into concrete, observable, measurable terms.

Choose Evaluation Methods. The team selects appropriate evaluation methods through a process that considers the questions to which answers are sought, the information sought, the best information sources, access to those sources, reliability of sources, and costs. Data collection often can be incorporated into regular management processes.

Design Record-keeping Procedures. System staff may design record-keeping procedures on the system's implementation as part of its management structure. Such procedures include periodic benchmarks for the collection and analysis of information drawn from system records as well as focus groups and interviews with key staff and participants. (Records include the proposal, mission statement, objectives, system description, curriculum, staff development materials, staffing structure, minutes of key meetings, student application and enrollment forms, and public relations and news coverage.) Staff should create a management information system to track the experiences of students throughout their tenure in the system, including numbers and categories of students, retention and completion rates, and changes over time in their use of the system.

Oregon State's Youth Transition Program has carried out comprehensive evaluations to document the impact of the school-to-work system on specific student outcomes and systems change. Data are collected from each of the system's local sites on a variety of demographic and programmatic factors, over two-year follow-up periods, and analyzed in several ways. First, outcome data are analyzed relative to the outcomes of comparison groups, including statewide samples of students who leave school and students not served by the system, and a nationwide sample from the National Longitudinal Transition Study. Second, the evaluators examine student outcomes separately for (a) rural versus nonrural participants, and (b) students identified as at-risk versus those not considered at-risk. The evaluations determined that participants consistently fare better than nonparticipants in terms of wages, employment, and productive engagement. Rural students were found to do as well as nonrural, at-risk as well as those not at-risk. For further information, contact Dr. Michael Benz, Associate Professor, University of Oregon, 175 College of Education, 5260 University of Oregon, Eugene, OR 97403-5260. (541) 346-1408.

The Milwaukee Public School System contracted with **SRI International of Menlo Park, California**, to conduct an evaluation of its school-to-work initiative. SRI worked in partnership with the school-to-work leadership throughout the 1994-95 school year, providing regular formative feedback and assisting with design and implementation issues. The evaluators surveyed students and teachers, examined documents, and conducted case studies. In August 1995, SRI released the first phase of the evaluation, documenting the early stages of the design and implementation in the 10 participating schools. In this initial process evaluation, SRI found several areas of strength and progress in the Milwaukee school-to-work system, including capacity-building and professional development of teachers, an emphasis on academic rigor and equity, a flexible and flat organizational hierarchy, and the role of liaison between educators and employers. While the evaluation is currently looking at the process of developing a school-to-work district initiative, SRI will provide input for a long-term evaluation of the school-to-work system, focusing on student outcomes. For further information, contact School to Work, Milwaukee Public Schools, P.O. Box 2181, Milwaukee, WI 53201-2181. (414) 475-8004.

[redacted]

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Organizations

The mission of the **Center for Human Resources (CHR)** at Brandeis University is to improve the quality of employment preparation and education services by combining knowledge gained from scholarly research and practical experience in ways that help policy makers successfully address the issues of long-term self-sufficiency for youth and young adults. CHR has assisted thousands of policy makers and practitioners to create community-wide strategies linking education reform, workforce preparation, and economic development. 60 Turner Street, Waltham, MA 02154. (617) 736-3770. hn4032@handsnet.org.

The **Center on Education and Work** at the University of Wisconsin is a research, development, and technical assistance unit of the university's school of education whose mission is to improve the linkage between education and work to ensure that all citizens engage in meaningful and productive careers. The Center develops new knowledge through research, designs and evaluates innovations, and translates research and development findings into practical solutions and effective policies through capacity-building technical assistance and dissemination. 964 Educational Sciences, 1025 West Johnson, Madison, WI 53706. (608) 263-3696. aphelps@mail.soemadison.wisc.edu.

The Education Development Center, Inc. (EDC) is an international nonprofit research and development organization whose projects span the globe, joining research with practice to meet challenges in education, health, technology, human rights, and the environment. EDC's National School-to-Career Consortium is a collaborative of 21 education, industry, labor, research, state government, postsecondary education, and community-based organizations established to provide technical assistance to school-to-work programs and systems. 55 Chapel Street, Newton, MA 02158-1060. (617) 969-7100. joycem@edc.org.

The mission of the **Far West Laboratory for Educational Research and Development (FWL)** is to challenge and enable educational organizations and their communities to create and sustain improved learning and development opportunities for their children, youth, and adults. FWL conducts research and evaluations, develops products and programs, provides assistance to education agencies at all levels, communicates the results of research and exemplary practice, and explores linkages among other agencies and institutions. 730 Harrison Street, San Francisco, CA 94107-1226. (415) 565-3000. sananda@fwl.org.

The Institute on Education and the Economy (IEE) at Columbia University is a multi-disciplinary research and technical assistance center. IEE conducts research on the implications of changes in the economy and labor markets for all levels of education and training systems in the United States. The Institute also provides technical assistance and evaluation services to schools, school districts, and states involved in work-related education reform. Teachers College, Box 174, 525 West 120th Street, New York, NY 10027. (212) 678-3091. iee@columbia.edu.

KRA Corporation is a small business professional and technical services organization. Its research and development division focuses on the application of the social and behavioral sciences to support policy making, planning, service delivery, and management, particularly in the area of youth programs. KRA's client divisions include research and evaluation, organizational consulting, information technology, and communications and management. 1010 Wayne Avenue, Suite 850, Silver Spring, MD 20910. (301) 495-1591. Infosys@KRA.com.

The mission of the **Manpower Demonstration Research Corporation (MDRC)** is to develop and test the effectiveness of promising education, employment, and training programs designed to help economically disadvantaged populations become self-sufficient. MDRC's approach is to take promising program ideas, look for public agencies and community organizations willing to implement a program on a trial basis, provide technical assistance to help these organizations, evaluate the effectiveness of the program, and actively disseminate the results. 3 Park Avenue, 32nd Floor, New York, NY 10016-5936. (212) 532-3200. Ivry@MDRCny.mhs.compuserve.com.

MPR Associates Inc. is a consulting firm specializing in public sector management, planning, and research. MPR has conducted numerous projects involving education for work, curriculum development, professional development, evaluation, data systems, and program management in areas related to education and job training for federal, state, and local government agencies, as well as private sector clients. 2150 Shattuck Avenue, Suite 800, Berkeley, CA 94704. (510) 849-4942. mpr@netcom.com.

The National Center for Research in Vocational Education (NCRVE) conducts research and development in work-related education and plays an important role in developing new models of career-focused education reform. NCRVE has an ongoing partnership with teams of teachers, administrators, and counselors from 30 schools in 26 major cities. 2150 Shattuck Avenue, Suite 1250, Berkeley, CA 94720-1674. 800-762-4093, 510-642-4004. slf@uclink4.berkeley.edu.

The National Center on the Educational Quality of the Workforce is a national research and development center concerned with workforce and education issues, which examines the interaction of employers, schools, students/workers, and public policy to determine how better connections among these stakeholders would improve the educational quality of the workforce and bolster the nation's competitiveness in a global economy. University of Pennsylvania, 4200 Pine Street, 5A, Philadelphia, PA 19104-4090. (215) 898-4585. eqw-requests@irhe.upenn.edu.

Public/Private Ventures (P/PV) is a national nonprofit organization whose mission is to help improve the policies, organizational practices, and initiatives undertaken by the private and public sectors to help young people, especially those from poor communities, increase their capacities to lead productive lives. P/PV designs, tests, and studies initiatives that increase support and access to opportunity for teenagers in low-income communities, and provides training and technical assistance to practitioners and programs in the youth field. One Commerce Square, 2005 Market Street, Suite 900, Philadelphia, PA 19103. (215) 557-4400. PPVYouth@aol.com.

The Urban Institute is a nonprofit policy research, evaluation, and technical assistance organization whose goal is to produce superior quality analysis and technical assistance to achieve sustainable and significant improvements in social and economic outcomes. Its expertise includes monitoring and evaluation systems, community needs assessment, local labor market analysis, development of performance standards, staff training, and assessment of program delivery mechanisms. 2100 M Street, NW, Washington, DC 20037-1264. (202) 857-8676. blerman@ui.urban.org

For more information about STW Resource Bulletins, please contact:
The National School-to-Work Learning and Information Center
400 Virginia Avenue, Room 210
Washington, DC 20024
Phone: 1-800-251-7236
Fax: 202-401-6211
E-mail: stw-lc@ed.gov
Internet: http://www.stw.ed.gov

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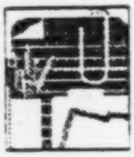

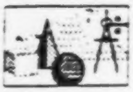

NATIONAL EVALUATION OF SCHOOL-TO WORK IMPLEMENTATION

LOCAL PARTNERSHIP SURVEY

U.S. Department of Education
U.S. Department of Labor
National School-to-Work Office
Washington, DC

Partnership Label

RESPONDENT: Please answer this questionnaire only about your partnership and its member districts and schools. Also, please keep track of the time required to complete this survey and enter that information on the last page of the surve

Please complete the following, in case we need to contact you to clarify the information provided.

NAME: ____________________

TITLE: ____________________

PARTNERSHIP NAME: ____________________

ADDRESS: ____________________

____

TELEPHONE NUMBER: ____________________ (Area Code) (Number)

BEST DAYS AND/OR HOURS TO CALL: ____________________

FAX NUMBER: ____________________ (Area Code) (Number)

DATE COMPLETED: ____________________

Please make a copy of the completed questionnaire for your files and return this document in the enclosed postage-paid envelope, or mail to:

Pat Nemeth
Mathematica Policy Research, Inc.
P.O. Box 2393
Princeton, NJ 08543-2393

Please feel free to call if you have any questions. The toll free number is ***1-800-303-6222***.

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Fall 1996

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